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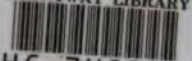
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ANNALS
OF
ANATOMY AND SURGERY.

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VOLUME VIII.

JULY-DECEMBER, 1883.



BROOKLYN, N. Y.

NO. 4 MONROE STREET.

New York: GUSTAV E. STECHERT, 766 Broadway.

London: J. & A. CHURCHILL.

Paris: J. B. BAILLIÈRE ET FILS.

Berlin: A. HIRSCHWALD.

Vienna: W. BRAUMÜLLER.

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ANNALS
OF
ANATOMY AND SURGERY.

SOME POINTS IN CONNECTION WITH THE
ANATOMY OF THE PLEURA AND
THE TREATMENT OF
EMPYÆMA.

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LITTLE would be gained at the present moment, even if time and opportunity allowed, by attempting anything like a general survey of the subject of empyæma, however superficial; and a more detailed account, even if distributed over several numbers, would doubtless be considered uncalled for and out of place; but much may, I think, be gained by a little skirmishing round a large question, if the expression be allowable, by indicating thoughts and experiences, possibly erroneous enough, that have occurred to one individual, and thereby eliciting, it may be, the opinions and perhaps directing the thoughts of the reader.

It will, perhaps, not be considered inappropriate to enter into a slight discussion of the anatomical extent of the pleural cavity. The surgeon who is seeking for an accurate account of this subject is doomed to some disappointment if he consults the ordinary text-books of anatomy, and if he have not easy access to more elaborate treatises, such as those of Pansch¹ and Sibson,² he may, perhaps, altogether fail in his search. The best description with which I am acquainted is to be found in Luschka's *Brustorgane*,³ which is well supplemented by the admirable plates contained in it as well as in the monograph on the *Bauchorgane*⁴ by the same author. The upper limit and the anterior border of the pleura are indeed easily ascertained and well known; for while it extends upwards as far as the lung and no further, that is usually from half an inch to an inch above the clavicle (the extreme variation being from nothing at all to an inch and three-quarters), the anterior border of each corresponds also pretty closely with the anterior edge of the lung, except below upon the left side, where it extends considerably nearer the middle line in front of the pericardium than is reached by the V shaped notch. Thus it is sufficiently accurate to say that this border is marked, on either side of the body, by a line commencing between the two heads of the sterno-mastoid muscle, and drawn downwards and inwards behind the sterno-clavicular articulation and the manubrium sterni, to the junction of the manubrium with the gladiolus, where the two meet; the right, however, projecting usually very slightly to the left of the middle line. They remain practically in contact as far as the level of the fourth costal cartilages, when each fol-

¹ Ueber die unteren und oberen Pleuragrenzen, von Ad. Pansch. Arch. für Anatomie. 1881. Page III.

² Sibson's Medical Anatomy.

³ Die Brustorgane des Menschen in ihrer Lage.

⁴ Die Lage der Bauchorgane des Menschen.

lows an almost straight line downwards and outwards to the sixth costo-sternal articulation or even as far as the lower end of the sternum.

But it is especially with regard to the lower limit of the pleura that inaccuracy is common, and that some degree of uncertainty exists. It reaches considerably below the lung, except perhaps when this is in an abnormal state of distension, but not so far down, for the most part, as the lower border of the thoracic parietes. Behind, however, it corresponds most frequently to the head of the twelfth rib, or, in other words, the eleventh dorsal spine; being seldom higher, but not unfrequently a good deal lower than this spot. This variation depends principally upon the length of the twelfth rib. The pleura reaches about as far down as the ligamentum arcuatum externum, and the length and position of this band depends upon the size of the twelfth rib: thus if the rib be long the ligament is long and low also, and under these circumstances a considerable piece of the pleura will be found below the level of the twelfth rib, while if the rib be short little if any will be met with in this situation. This point can hardly have any practical bearing upon the question of tapping the pleural cavity, as no surgeon would be likely to make even a second opening so far down; but it does bear upon a point now often spoken about, namely, the advisability of the removal of the twelfth rib in order to gain more room in difficult cases of lumbar nephrectomy, as it suggests the danger of opening the pleura in the course of such a procedure, an accident indeed which has actually happened. It might also help to clear up a difficulty in diagnosis if a septic pleurisy were to follow a gunshot or other wound near the spine but below the twelfth rib.

The actual line of the lower limit of the pleura at the side and anterior part of the chest is given with great

minuteness by Luschka¹ (I have placed the exact words in the foot-note for reference in case their accuracy should be in anyway lost by translation ;) but, for practical purposes, this minute description may be summarized in the following way: Starting from the eleventh dorsal spine the line passes horizontally outwards till it reaches the lateral part of the chest; it then ascends gradually, being distant in this position about two or three inches from the lower margin of the thorax, and then passes behind the seventh costal cartilage to the sternum. Towards the front it extends usually a little lower on the left than on the right side.

It is, no doubt, an attractive notion that, in opening an empyæma, the incision should be made at the very lowest part of the pleural cavity with the object of obtaining the best possible drainage. A little consideration of the peculiarities of the cavity in question will, however, show at once that what seems at first quite obvious is not, in reality, a truism, and in fact is open to very serious objections. In the first place, this lowest part of the pleura very often does not actually exist at all by the time that a pleura has to be opened, because, in the early stages of the inflammation which has led to the mischief for which relief is sought, the diaphragmatic and costal pleuræ have already become adherent in the parts in which they are normally in contact. But

¹ Wenn man die Stelle als den Ausgangspunkt nimmt, an welcher jederseits der Rippenheil des Brustfelles an seinem vorderen unteren Ende das Diaphragma zuerst berührt, dann findet man es als die Regel, dass die Pleura auf der linken Seite hinwegzieht hinter dem äusseren Drittel des Knorpels der 6ten und 7ten Rippe, dagegen in gar keine Berührung mit dem Knorpel der 8ten bis 12ten Rippe; sondern es läuft das untere Ende des Rippenfelles, beim Erwachsenen *vom obern Rande der bezüglichen Rippen aus gemessen*: 8 millimètres hinter dem äusseren Ende des Knorpels der 8ten; 2 millimètres hinter dem äusseren Ende des Knorpels der 9ten; 2½ centimètres hinter dem äusseren Ende des Knorpels der 10ten; 4½ centimètres hinter dem äusseren Ende des Knorpels der 11ten; 4 centimètres hinter dem äusseren Ende des Knorpels der 12ten Rippe schief nach hinten und unten. Auf der rechten Seite weicht das untere Ende des Rippenfelles nur darin vom Verhalten auf der linken Seite ab, dass es hinter dem ganzen Knorpel der 6ten Rippe, schief herabläuft, dann aber eine im wesentlichen mit der ausserseitigen übereinstimmende Richtung gewinnt.

even if they have not done so, it happens in most cases that after the chest has been opened and a free escape has been afforded for its adventitious contents, the lung having receded and the chest walls having a tendency to collapse spontaneously, the upward tendency of the abdominal viscera as the patient lies upon his back, brings a large part of the upper surface of the diaphragm into contact with the chest walls, and thus potentially, if not actually obliterates this lower part of the cavity. It must have happened to many surgeons, as to the present writer, after having made the incision low down in the posterior axillary line, and inserted the finger between the ribs, to feel the great mass of the diaphragm pressing against the incision, and to be painfully aware afterwards that it necessitated an upward tendency of the drainage tube, which materially interfered with its efficiency and the ease with which it could be re-introduced at the periodical changing of the dressing. For my own part, in children, or where the chest walls are not very substantial, I prefer making the incision in the back, directly below or a little outside the line of the angle of the scapula, either in the seventh, eighth or ninth interspace, as the peculiarities of each case may make most desirable. This position affords as good drainage as can be desired as long as the patient is recumbent, and a very efficient one when he is allowed to sit up, while the opening is not high enough to be at all interfered with by the movements of the scapula, as may happen if one of the higher interspaces be selected. If the chest walls be very muscular, an opening in this position involves a rather deep incision through the soft parts, and under these circumstances probably no spot is more suitable than that which has long been recommended as the seat of the election, namely, the fifth or sixth interspace immediately in front of the posterior fold of the axilla.

Mr. Marshall, in a series of interesting and instructive

lectures delivered last year at the Brompton Hospital,¹ expressed his belief that in the majority of cases in which an empyæma ruptures spontaneously, this will be found to have taken place at a point just outside and below the junction of the fifth rib with its cartilage; and he points out, as



FIG 1. LOWER PART OF THORACIC WALLS ON THE RIGHT SIDE.

A, pectoralis major; *B*, pectoralis minor; *C*, serratus magnus; *D*, external oblique; *E*, rectus abdominis; 3, third costal cartilage; 4, fourth costal cartilage; 5, fifth costal cartilage; 6, sixth costal cartilage; 7, seventh costal cartilage; 8, eighth costal cartilage; 9, ninth costal cartilage; * placed just above Mr. Marshall's spot; † aponeurosis, common to external oblique and pectoralis major and covering rectus; ‡ xiphoid appendix.

accounting for it, that this spot which is covered by the outer edge of the pectoralis major, is outside the upper part of the rectus abdominis, and beyond the anterior limit of

¹ Lectures on diseases of the chest cavity requiring surgical treatment. Delivered at the Hospital for Consumption at Brompton, by John Marshall, F.R.S. Professor of Surgery at University College Hospital. Consulting Surgeon to the Hospital for Consumption at Brompton. Vide *Lancet* for March 4 and March 10th, 1882, and other previous and succeeding numbers.

the external intercostal muscle of the fifth space. It is thus comparatively free from superjacent muscles, and it was also demonstrated by several examples that a dissection, made as in the accompanying figure (Fig. 1), and held up to the light, shows a distinctly diaphanous spot just below the point indicated thus.* He goes on to argue that the surgeon will act wisely in imitating nature by selecting the same spot for his incision, and he adduces facts to illustrate the excellent results which have followed spontaneous rupture in this situation. To this it may be replied that though perhaps a common, it is by no means the invariable point of rupture.¹ My own experience of this occurrence is, comparatively speaking, small, but I must own to an impression founded upon a certain number of cases, and confirmed by the observations of several surgical acquaintances, that the second or third interspaces in front are perhaps the most usual seat of this perforation; and, indeed, Mr. Marshall allows that this is said to be the commonest position in children; I have, moreover, seen it occur in the adult low down and behind.²

It is also adduced as an argument in favor of opening the chest at the spot indicated by Mr. Marshall that "it corresponds very nearly with the middle of the pleural cavity when that is much distended," and that the fifth space, though not so wide as those above it, is wider than those below, and at least always affords a sufficient interval between the ribs to permit of a very free opening. Still, even allowing the accuracy of Mr. Marshall's position, which there is undoubtedly a large amount of evidence to support, a

¹ It must not be forgotten that a large number of empyæmas are loculated.

² During the last few weeks I have seen three cases of spontaneous rupture in children; one, a very putrid case, had given way in the second interspace one inch from the sternum, but there was also a smaller opening immediately below it in the fourth interspace close to the junction of the rib and cartilage; there were also spots of softening in the third and fourth interspaces. In the other two cases rupture had occurred near the anterior end of the seventh interspace.

demurrer may be entered that nature does not always choose the best possible place for the opening of an abscess. This almost goes without saying ; but, to give an example amongst many that might be cited, let us take the case of a psoas abscess. If nature be left alone, the abscess will burst most likely in the upper part of the thigh ; but even then it may not occur until the abscess has extended to the inner side of the vessels, or even have reached a considerably lower situation. Now if the surgeon have efficient means at hand for the management of such cases antiseptically, it may confidently be stated that a better result in every way is likely to be obtained by opening the abscess above Poupart's ligament, cutting down upon the sac through the abdominal muscles as though for the ligature of the external iliac artery. This may be safely done before the pus has made its way below Poupart's ligament ; but even if it has already occupied the thigh, it may be opened in the high position ; the advantages claimed for this plan being that the drainage tube passes directly into the abscess cavity without the risk of becoming constricted at Poupart's ligament, and also that the wound is further removed from the external genitals, and thus it is much more simple to carry out the details of the antiseptic treatment efficiently. I can speak from the experience of many cases brought to a successful termination in advocating this method of procedure, and it should be added that it was originally recommended, and is practised by Mr. Lister.

But, to return to the pleura : if the obviously unsuitable positions be avoided, it is, I believe, of far greater importance than the mere determination of the locality for the incision, that the surgeon should follow a method of paracentesis that ensures a thoroughly free opening into the chest, and the certainty that he shall be able to reintroduce the drainage tube without difficulty. In children, I have, for

some time past, adopted as a routine practice the removal in all, or almost all cases, of a portion of rib; the method of procedure being as follows: An incision for two inches or more is made directly over the rib selected, and this is joined, at its mid point, by another an inch long, carried downwards at right angles to it. It is deepened until the rib has been completely exposed throughout the length of the first incision, and then the periosteum is divided in a direction parallel to the long axis of the bone. It is then raised by means of a periosteum-elevator, which is also passed beneath the rib so as to separate it from the deep surface, a manoeuvre which is rapidly and easily accomplished. A curved elevator is then slipped completely beneath the rib which is thus raised slightly from those immediately above and below it, and a piece, from one to two inches long, is removed either by cutting pliers alone, or after first dividing the bone half through with a small saw. This is all completed before the pleura, or indeed the deep part of the periosteum are in any way interfered with. The soft parts being held aside with hooks, the pleura is then incised at leisure, and the opening is enlarged by expanding the blades of a pair of dressing forceps. The risk of wounding the intercostal artery is thus absolutely avoided, and if any vessel be divided, either in the superficial or the deeper structures, it is easily seen and readily secured. Such an opening often admits the finger, if it be thought advisable to introduce it, and in the subsequent progress of the case the removal of the portion of the rib leads to no inconvenience. I have not met with necrosis or caries as a result of it, though it is possible that such may occur sometimes; and, after a cure has taken place, a very careful examination fails to detect that any part of the bone has been taken away. I am inclined to think that it would be well to adopt the same plan in dealing with, at all events, many cases of

adults, seeing how common it is for caries or necrosis of one or both ribs to occur when the incision has simply passed through an intercostal space, and that it is not by any means very rare to find, in a chronic case, that the ribs have become united together by means of two transverse bars of bone, one on each side of the sinus; so that the track passes through a narrow osseous ring. As an illustration of this occurrence, I may mention a case, recently under observation, in which an attempt was made to enlarge such a sinus by means of a sea-tangle tent. The patient suffered no pain in consequence of its introduction, and the surgeon found next day, to his surprise, that the tent was firmly wedged in and could not be removed, while it of course completely blocked the opening. In this case I was obliged to remove a portion of two ribs with the intervening spurs of bone in order to extract the sea-tangle and to make a sufficient opening into the pleura.

I will only mention, in passing, as I have no personal experience of the operation, a plan that has been suggested by some continental surgeons in order to favor the collapse of the chest wall, *i. e.*, the removal of portions of several ribs. Mr. Marshall, in the lectures referred to above, alludes to some cases in which he has adopted this plan, as well as one in which he divided several of the costal cartilages with this object in view; his patients seem all to have derived some benefit from the operation, though none of them, at the time of report, were absolutely healed. In most cases, before resorting to so severe a measure, it will, no doubt, be thought wiser to make a thoroughly efficient second opening in a dependent position, as it is well ascertained that many obstinately chronic empyæmas have in this way been enabled to close.

Most surgeons are probably persuaded that they have discovered the best possible drainage tube to employ for em-

pyæma. Let me, therefore, indicate that which seems to me to be the most universally applicable; it is certainly very efficient, and has the advantage of being very easily made. It was, I believe, first suggested by Dr. E. Buchannan Baxter, of Kings College Hospital. A round hole is first cut in a piece of red India rubber sheeting 1-12 inch thick and about $1\frac{1}{2}$ or 2 inches square, a tube of the size required, and without holes,¹ is then split at one end into four pieces, which are drawn through the hole in the flat piece of rubber, turned down as in the drawing (Fig. 2), and fixed in position by stitches of fine silver wire. The surgeon can keep a stock of these tubes of different dimensions, or he can make one for himself, in a few minutes, of any required size. They adapt themselves to a sinus leading in any direction, and require no special manœuvres to prevent them from slipping

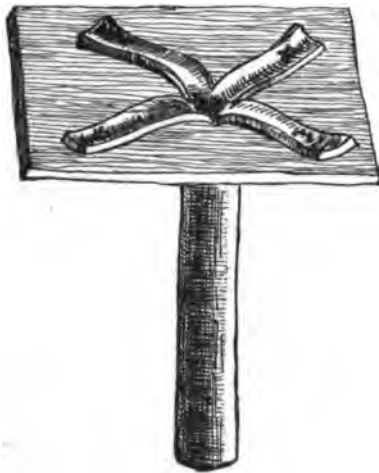


FIG 2. DRAINAGE TUBE FOR USE IN EMPYÆMA.

into the chest; they may thus be left beneath an antiseptic dressing for a week, if need be, in confidence that they will work well all the time. They will be found very useful in the treatment of many other kinds of abscess. I do not wish to disparage other forms of tubes, the name of which is legion. At the Brompton Hospital, for example, a great variety of ingenious and excellent devices may be

¹ The tube should be just long enough to project into the chest cavity—say $1\frac{1}{4}$ to $2\frac{1}{4}$ inches—according to the thickness of the chest wall. Nothing is gained by coiling up an enormous length of tubing in the chest.

seen, but I doubt if any will be found to work better than the simple plan I have described.

As to the dressing, I cannot doubt that the strict Listerian antiseptic plan is the best. There is hardly an exception to the sudden drop of temperature, and the maintenance of the apyrexial state when this method is adopted ; and in ordinary cases, in children, a cure in from three weeks to three months is so common as to be almost the rule. It is, of course, easy to adduce instances where the pus has been already putrid, and yet, when it has been evacuated, the course of the cure has been as rapid and uninterrupted as in the best cases treated antiseptically. Such a result is not, however, invariable: the only two deaths from empyæma which I have met with in the last year were in putrid cases; one an adult, who developed pericarditis, and pleurisy on the opposite side; the other in a child, referred to in an earlier part of this paper, in whom the spontaneous rupture into the soft parts of the chest had occurred, and who was already *in extremis* before he came under observation. But it must be remembered that the incision into the chest, under such circumstances can have only a beneficial effect; it does not introduce, in all probability any fresh putrifactive process, as happens if a case which is pure to begin with be opened without antiseptic precautions; and even if it be supposed to do so, the lining of the chest cavity is in a very different condition in the two cases; in the former it has no doubt been covered with granulations, which from their long exposure to putrid pus are but little prone to absorption of its poison; while in the latter, it may be very slightly altered from its normal state, or if it be covered by granulations, they are as ready to absorb the poison of putridity as is the pyogenic membrane of a recently opened spinal abscess. Hence the explanation of the apparent anomaly. Examples of this variety in the absorbing powers of different surfaces

must at once suggest themselves : I opened, some years ago, a large psoas abscess, the contents of which had become offensive in the highest degree, as the result of an unsuccessful attempt at aspiration with a presumably impure needle a few days before ; the child, at the time, was suffering from intense constitutional disturbance. On the other hand, I have seen a patient with chronic disease of the hip joint and sinuses, in whom a large collection of very stinking pus, which had been pent up for some days, appeared to cause but little increase to the hectic symptoms, from which he was suffering, though the matter was so poisonous that his father, who was a doctor, died within forty-eight hours after pricking his finger whilst changing his son's dressings.

I think we often make a mistake by keeping a drainage tube in for too long a time. There is a very considerable absorbing faculty in the pleura, even after its contents have become purulent, as is proved by the undoubted fact, that not a few cases yield to aspiration, sometimes after a single evacuation, sometimes after it has been twice or thrice repeated ; although it is, of course, obvious that we never do, it might almost be said, we never can actually remove the whole of the contents of the pleura, except in those rare instances, where the elasticity of the lung remains absolutely unimpaired. So convinced am I of this fact, that I should always recommend that one or two or even three aspirations should be practised, in the case of children, at intervals of not longer than a week, unless the symptoms were particularly urgent. It is not therefore necessary, as in an ordinary abscess to keep the tube in until the cavity is reduced to a mere sinus. The advantage of allowing the opening to close as soon as ever the amount of secretion is so small that the absorbing power of the pleura may be counted upon to remove it, consists in the fact that

two fresh agents are brought to bear upon the lung to cause it to expand ; namely this absorbing power of which we are speaking, and the suction exerted by the chest walls in the movements accompanying respiration. Before the tube is removed there is, as far as I know, only one agent at work, and that is the gradual contraction of the granulation tissue along the line, where the visceral and parietal layers of the pleura come into contact with one another. It is not a little remarkable, that this contraction should be as efficient as it is in cases where the tube has been retained in position until the discharge is reduced almost to nothing. It will no doubt happen from time to time, that some reaccumulation occurs after its removal, which will probably be indicated by a rise of temperature, and the return of some difficulty in breathing ; but if a free opening has been made at first, in the manner indicated above, the probable cause of this mishap, namely the too early closing of the incision will most probably have been avoided ; while, if it does occur, the drainage tube can be reinserted with almost no difficulty. There is, at the present time, in the North Eastern Hospital for children, an infant, a year old, suffering from empyæma ; it was aspirated first on January 9th, when a pint of thick pus was withdrawn, and again on January 16th and January 23rd, when six ounces and four ounces were taken away respectively. On February 10th, a free incision was made, a portion of rib being removed, and a tube was inserted. The discharge had very much diminished, a fortnight after the operation, and the tube was removed on February 24th, and now March 27th, though there is still a very trifling oozing, but the chest is resonant, and the temperature is normal.¹

There are one or two little points, which are not without

¹ Since the article was written this child has died. *Post mortem*, besides considerable disease of lung, an empyæma on the opposite side was discovered. The sinus had not completely closed but the rib had united.

importance, in respect of the method of applying an efficient antiseptic dressing, and retaining it in position securely when applied. It should consist, in the first place, of a larger mass of gauze than is used in ordinary cases, and, after surrounding the trunk with a suitable number of circular turns of a soft muslin bandage, a piece of elastic webbing one inch wide should be carried round the upper and lower borders. If a turn of the muslin bandage be then taken over one shoulder and under the perinæum, and then back to the shoulder again, and secured to the upper and lower parts of the dressing in front and behind, there is no chance of its slipping either up or down. Whatever may be said of the use of the spray in ordinary cases, it will at least be allowed, that, if it is advisable to employ it at all, an empyæma is *par excellence* the condition in which its use seems most rational, for a rapid sucking in and out of air during the dressing can hardly be prevented.

If a case be treated antiseptically, it is seldom necessary to wash out the pleura; a procedure, the responsibility of which most surgeons will probably be very glad to be relieved from; certainly, it will be the case with those who, like the present writer, have had the misfortune to witness a case of sudden death during the process. It happened some years ago, in a little boy with an old and much contracted empyæma-cavity, accompanied by extensive lateral curvature of the spine. The injection of a weak solution of iodine had frequently been practiced on him before; but, one day, without any warning, the child expired while the injection was being made, and *post mortem* we were unable to discover anything to which the fatal occurrence could be ascribed.

A pleural abscess may occasionally depend upon some altogether unexpected cause, such as the rupture of a pericæcal abscess in the chest. I once opened the pleura

of a young woman who was suffering with all the symptoms of empyæma; but whose sputa had for some days been deeply bile-stained, and was not a little surprised to find that the pus in the pleura was not only bile-stained also, but that it contained enormous numbers of empty hydated cysts, which continued to pass through the tube for a long time after the chest had been opened.

I will bring this disjointed paper to a close, by referring to a case which seemed to me to indicate the danger of employing ether as an anæsthetic during the paracentesis; and I do so in the hope of eliciting an expression of opinion by American surgeons upon the question. It was that of a girl about eighteen years of age, who was "spitting up her empyæma." She lay during the operation of paracentesis upon her sound side, thereby impairing to some extent its utility, the affected side was of course rendered absolutely inert, as soon as it was opened; she coughed up during the operation a certain amount of pus into her trachea, and added to this was the bronchial flow resulting from the inhalation of the ether. The combined effect was to produce a most alarming state of obstruction to the breathing, accompanied by a very serious overloading of the right side of the heart; and I believe, if we had not promptly taken some blood from the arm, and practiced vigorous artificial respiration, the patient would have slipped through our hands.

VOLUNTARY DILATATION OF THE EUSTACHIAN CANAL.

By THOMAS F. WOOD, M. D.,

OF WILMINGTON, N. C.

I have been recently led to enquire, "*Is there a voluntary muscle controlling the pharyngeal meatus of the Eustachian Tube?*" The enquiry arose from this personal experience. One day when using Camman's Stethoscope, I heard a loud blowing sound proceeding, apparently, directly from my ear into the aural end of the tube of the stethoscope. Repeating this experiment again and again, I found that I could dilate the pharyngeal aperture of the Eustachian tube, at will. It is of course hard to describe intelligibly such sensations, but with my mouth closed, if I make an effort which gives a sensation precisely like that which one experiences in the first act of yawning, I can by an effort of the will keep the aperture open, and with the mouth closed, send air into the tympanic cavity.

It was suggested by a student that possibly I had acquired control over my tensor tympani muscle, but this would not explain the matter, as I can distinctly recognize the cool air passing into the cavity of the tympanum, when I make the effort before described.

I have no work at hand in which I can find similar experience recorded. Buck (*Diagnosis and Treatment of Diseases of the Ear*, p. 146) describes something similar. He says, "Some years ago, while gaping, I suddenly discovered that I had unconsciously rendered one Eustachian tube unnaturally patent. I succeeded in keeping my jaws in

this peculiar position long enough to satisfy myself that it was a possible thing to maintain the Eustachian tube in a perfectly patent condition for a shorter or longer time, according to the will of the experimenter. The rushing sound caused by the air as it passed to and from the middle ear with each act of respiration, the easily felt to-and-fro movement of the drum-membrane, and the cool sensation caused by the moving current of air, all furnished unmistakable evidence of the existence of an open channel of some size between the naso-pharynx and the middle ear. I have often tried since to reproduce this condition, but have only succeeded partially. It is not an uncommon thing, however, for patients who suffer from chronic Eustachian catarrh, to learn the knack of twisting their jaws in such a way as to open, for an instant, the obstructed Eustachian tube, and in this manner to obtain relief from the sensation of pressure which many of them find so annoying."

In my case I make no contortions of the face or jaw. Since the discovery of my ability to dilate the Eustachian orifice, I have been enabled by practice to increase my ability to distend it to the utmost limit and keep it distended until the discomfort causes me to desist.

I think, with Dr. Buck's experience as above quoted, that he could develop his control over the Eustachian aperture by frequently imitating the first part of the effort at yawning, or by suppressing a yawn by closing the mouth.

I am firmly impressed with the belief, that in my case, at least, there is a set of voluntary muscles controlling the pharyngeal Eustachian orifice, and it may be possible by minute dissection to determine this. From Dr. Buck's statement I am sure that mine is not likely to be a unique case, and that with a larger observation, it will be shown to be not an uncommon faculty.

HISTORICAL AND BIBLIOGRAPHICAL NOTES.

A SERIES OF SKETCHES OF THE LIVES, TIMES AND WORKS OF THE OLD
MASTERS OF ANATOMY AND SURGERY.

By GEORGE JACKSON FISHER, M.D.

XXI. ABÛL-CÂSEM CHALAF EBN-ABBAS AL- ZAHARAVI, COMMONLY CALLED ALBUCASIS.

1060—1122.



ALBUCASIS was a Spanish Moor, and is said to have been born at Al Zahra, or Zahera, in the vicinity of Cordova, in Spain, but in what year we are not credibly informed. Friend (Hist. of Physic, Pt. II., p. 128), says he finds "no certainty of this author's age, but he is generally

(though for what reason I do not apprehend), supposed to have lived about the year 1085." Moir (Outlines of the Ancient Hist. of Med., p. 258), declares that "Casiri has proved, from incontestable evidence, that, at all events, he died in 1122." Haller places him in 1080, and Eloy in 1085. Choulant quotes two widely different dates for the year of Albucasis' death, one being 1013, the other

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1106. The period is probably very uncertain, and it is altogether needless to attempt to reconcile the discrepancies of learned writers on this point.

A very curious bit of confusion also exists among medical historiographers as to the identity of two names not unfrequently met with, viz.: Albucasis and Alzaharavius. Friend maintains that they represent one and the same individual. Perhaps the most satisfactory thing to do is to transcribe Friend's own account of his mode of arriving at the conclusion, that the two names belong to the same author. In speaking of Alsaharavius, he says, "In perusing this author, I observed that he refers to a book, which contained the Precepts and Practice of Surgery: this he does very often, particularly p. 80 to 127 (13 times), I compared these passages with Albucasis, as he is commonly called, the only Arabian who has left us any separate treatise of chirurgical operations; and I had the satisfaction to see, that every case in surgery, as mentioned by Alsaharavius, was treated of by him. I desired the favour of Mr. Gagnier, who has very great skill in the Oriental languages, to enquire whether the Arabic original of Albucasis could be found in the Bodleian Library. Upon searching, he met with one Manuscript in Archbishop Marsh's collection, No. 54, with this title (translated into Latin thus): *Tractatus x libri Zaharavi dictus operatio manus (i. e.), Chirurgia and ars medica*, etc.—but not finding the name of Albucasim (which is the name given him in a Latin M.S. there by Gerardus Carmonensis, who translated him), he went further, and found another M.S. amongst Dr. Huntington's, No. 156, with this title at large—*Pars xi libri Al-Tasrif, Authore Ablâ-câsem Chalaf Ebn-Abbas Al-Zaharavi*—and at the end of the M.S. were these words translated out of Arabic thus, *Explicit hîc Tractatus de Chirurgia estque conclusio totius libri Practices medicinæ cujus Author est Ab'ul-casem, etc. Die*

primo mensis Safar, A. H. 807, and in the Latin M.S. already mentioned of Gerardus, it is called *particula 30 libri Albucaism*. The joint authority of these two MSS. concurring with what I have observed before, about the references to a treatise of Surgery, puts it, I think, beyond all dispute, that what we have now under the name of Alzaharavius and Albucasis were writ by the same person. Add to this, that Albucasis often refers to a book, which he had writ concerning the Practice of Physic." (Op. cit. p. 126-128). Moir dissents from the above opinion of Friend, and believes that they are two distinct writers, Albucasis being a celebrated and quite an original author on Surgery, while Alzaharavius was a merely servile copyist from the writings of Rhazes, and Albucasis. The learned Dr. Ludwig Choulant (*Handbuch der Bücherkunde für die Ältere Medicin*, Leipzig, 1841, p. 372). Renouard (*Hist. of Med.*, p. 264), and others, accept the two names as designating the same author. This seems to be the most sensible view to take of the matter, and quite evident when we observe the name of the place of nativity which all writers assign to Albucasis, viz :—Al-Zahera—which when Latinized was rendered Alzaharavius.

The name of this author will be found variously modified, and in some instances almost unrecognizable, as we meet it in medical literature. The original names of Arabic medical writers have undergone remarkable metamorphoses by translation into mongrel Spanish, barbarous Latin, and ever-varying English. In this instance we find Albucasis, Albucasim, Abulcasis, Albucazi, Abul-Kasem, Bulchasin, Bucasis, Casa, Alzaharavius, Alzaharavius, Al-Zaharavius, Alzahrawi, and Benaberazerim.

Of his personality and private history, unfortunately, no particulars have been handed down to us, with the

exception, that he was a high-minded practitioner, to whom the love of pecuniary gain was a minor consideration, who possessed a dignified, liberal, and disinterested spirit, and gained the respect, gratitude, and love of his countrymen. And now that nine centuries have rolled away, he is regarded as the most celebrated and eminent Arabian surgical writers, of any whose works have survived the wasting influences of time.

The "Al-Tasrif," or the Art of Healing, of Alzaravius, was little more than an abridgment of the theory and practice of Medicine as understood in that day, and though not devoid of merit, being in advance of all similar works in systematic and methodical arrangement, it must, however, be admitted that it was largely made up of extensive transcripts from Rhazes and others of his predecessors, as well as from the Greeks, Hippocrates, and Galen, Ætius, and Paulus Ægineta, although he fails to mention the names of any except the two former. What appears quite strange is the fact that Alzaravius is entirely unmentioned by any of the Arabian medical writers.

It is with the *Chirurgia* of Albucasis that we are most interested, and with the perusal of which we are most amply repaid. This is a work of great value. Fabricius ab Aquapendente esteemed this work very highly, saying, "Celsus among the Latins, Paulus Ægineta among the Greeks, and Albucasis among the Arabians, form a triumvirate to which I confess I am under great obligations."

Avenzoar and Albucasis bear concurrent testimony to the almost extinction of surgery at the time they entered upon their career. Albucasis gives the following reasons for having written his work on surgery :

"After having terminated, happily enough, the work on Medicine which I undertook for your instruction, my sons, I have thought it proper to add to it a small treatise on

manual operations, seeing that this part of our science is so much neglected in our country at the present time, that there remains scarcely any vestiges of it. We can only find a few short descriptions of operations in the books of the ancients; they are, however, disfigured by the ignorance of the bookmakers; the manuscripts are so faulty, that at every step we are in such doubt as to the sense of the authors, that no one dare enter into the study of surgery. I have, therefore undertaken this little treatise for the purpose of reviving this most important and useful branch of our Art. I have detailed briefly the methods of operation, I have described all the necessary instruments, and I present their forms, by means of drawings; in a word, I have omitted nothing of what can shed light on the practice. But one of the principal reasons why it is so rare to meet a skillful surgeon is, that the apprenticeship to this branch is very long, and he that devotes himself to it must be versed in the science of anatomy, of which Galen has transmitted us the knowledge. He should know the functions of organs, their shape, and their relations; the number of the bones, and their modes of union; the origin and termination of the muscles, the nerves, the arteries, and the veins. In fine, no one should permit himself to attempt this difficult art without having a perfect knowledge of anatomy, and the action of remedies" (lib. I.).

It will be observed that Albucasis, who places so high an estimate on the value and necessity of an exact knowledge of anatomy to the surgeon, is everywhere silent on the subject of dissection, and only points to the works of Galen as the repository of this science.

His treatise on Surgery is divided into three books. The first comprehends everything relating to the multiple uses of the cautery, a favorite remedial agent among the Arabians, in all its forms—actual and potential—the modes of

application, the various instruments and escharotics to be employed, the requisite cautions, and much detail. He enumerates fifty diseases in which he had observed their utility. The second book comprises all that relates to operations to be performed by the use of cutting instruments. He describes numerous instruments which may be seen figured in both of the Bodleian MSS., as well as in most of the Latin editions of his works. He also gives directions for many surgical operations, ranging from the simplest to the most formidable. He describes ninety-seven operations performed with the knife, several of which will be mentioned farther on. The third book is devoted to the treatment of fractures and dislocations of the bones. He tells us that this branch of surgery had unhappily fallen into the hands of the most ignorant, vulgar and impudent pretenders, and was looked upon with contempt and suspicion.

Albucasis assures us that his work is founded upon extensive reading and large personal experience, and that he had written nothing that he had not witnessed in his own practice; and yet the work is little more than a fair exposition and epitome of the principles and practice of Arabian surgery as taught by his predecessors. There is no other work of this period, however, that is at all comparable with this in general completeness, richness of detail, and lucidity in description. It is of especial interest and value in that it is the first surgical work that has furnished the moderns with figures of the ancient surgical instruments, already alluded to, as well as careful descriptions of the same. Indeed, it may truly be esteemed as one of the most precious relics of the healing art which has been transmitted to us from mediæval times.

In presenting a brief analysis of the surgical views and practice of the Arabians as we find them set forth in the writings of Albucasis, I will begin with his first book relating to the use of the cautery.

Albucasis, in common with all the Arabian surgeons, was particularly partial to the actual cautery. Friend says, "he seems to be in a rapture in speaking of the divine and secret virtues of fire." Even ages before, Dioscorides, the contemporary of Celsus, spoke of the use of the actual cautery as the "Arabian burnings." We find Albucasis using it extensively and with great success as he claims in obstinate cases of Sciatica.

Albucasis mentions four modes of curing trichiasis.

1. By the actual cautery.
2. By the potential cautery.
3. By incision and suture, which operation he describes with minute detail, much after the mode of Paulus Ægineta.
4. By making an incision the whole length of the lid, within the ciliary hairs, and twisting the redundant skin firmly about reeds or small pieces of wood until it mortifies, then curing the wound as any other.

He describes many other operations belonging to ophthalmic surgery; such as eversion of the eyelids, lipoma of the lids, adhesion of the eyelids, encanthis, pterygia, staphyloma, hypopyon, fistula lachrymalis, and cataract.

In cases of abscess resulting from obstruction of the lachrymal duct, he directs us to open the abscess freely, so as to make an outlet for the pus, and expose the bone. If it is found to be diseased, he recommends us to scrape it with an iron instrument, and then to apply styptic and desiccative medicines to it. When this treatment fails, he directs us to perforate the bone with a triangular instrument of iron. When air issues from the nose by the opening we know, he says, that the operation is completed.

In operations for cataract by depression, Albucasis describes the process of Paulus Ægineta with great minuteness of detail, and gives drawings of the couching-needles, called by him *almagda*. The instrument is to be passed down into the eye to as great a space as the pupil of the

eye is distant from the end of the black part called the cornea. He says nothing of tearing the cataract into pieces when it proves difficult to depress. He mentions that he had heard of a certain oculist who, it was said, sucked out the cataract (lens) through a small tube. He adds, however, that he had never seen any person who had performed this mode of operation, nor had he read about it in the works of the ancients. (*Chirurg. ii.*, 23.) Rhazes accurately describes the operations of couching, extracting, and sucking out the cataract. (*ad Mansor, ix.*, 27, and *Cont. ii.*) Our author gives judicious directions for treating imperforate meatus auditorius; and also for the removal of foreign bodies from the same passage. For the extraction of a piece of stone he recommends us, among other means, to use a slender forceps, of which he gives a drawing. It resembles the ordinary dissecting forceps now in use. He also gives a drawing of a hook slightly bent, which he commends; and also of a brazen tube to be used for sucking out foreign bodies from the ear. When other means do not succeed, he directs us to make an incision at the upper part of the ear, having previously let blood in order to avert inflammation and convulsions. Insects are to be sucked out with a tube narrow below and wider externally, or they are to be extracted with a forceps or hook. When these means do not succeed, an oil, to which some substance destructive to these animals has been added, is to be injected with an instrument, of which he also furnishes a drawing.

Albucasis minutely describes the operation of excision and also of sawing out fibrous polypi from the nasal cavities. In the former case he directs us to seize the tumor with a hook, to pull it down, and cut it out. If any part remain he recommends us to scrape it out with a slender instrument, and then to apply styptics, such as vinegar, water, or snow. The operation of sawing it out with a

thread moderately thick, like a cord, tied in knots at short distances, is fully described by him. He also speaks of cauterizing the part from which the tumor was removed. Epulis, a soft, fleshy excrescence which forms upon the gums, was treated by Albucasis by excision with forceps and scalpel, after which styptics are to be applied to the part, and if the tumor should grow again, the actual cautery, knob-shaped, must be resorted to. (Chirurg. i, 22, and ii, 28.) The same treatment is advised by modern surgeons.

Of all the ancient surgical writers Albucasis has treated the subject of operations upon the teeth with the greatest fullness and care. He directs that free scarification of the gums be made before performing extraction, and then pulling the tooth direct with forceps, the patient's head being meantime held between the knees of the operator. (The writer of this sketch has vivid and painful recollections of submitting to this mode of vice-like retention of the head, while a rural Arab-of-a-doctor wrenched a molar from his inferior maxillary with a cant-hook, known to many still living, as a turn-key. This heroic method is not yet entirely obsolete.) Albucasis directs that hollow teeth be stuffed with a tent of cloth before applying the forceps. If a piece of the alveolar process be broken, he advises its removal. He also gives directions for filing projecting points or diseased portions of teeth. When teeth have been loosened by accident, he directs that they shall be secured by threads or wires of gold. In his second book, thirtieth chapter, he gives drawings of instruments for the extraction of roots of teeth.

[To be Continued.]

NEW YORK SURGICAL SOCIETY.

CASES OF EXCISION OF THE KNEE-JOINT.¹

THREE patients upon whom he had performed excision of the knee-joint were presented by Dr. C. T. Poore. All the operations were performed with the circular incision. The antiseptic spray was not used. The wounds were thoroughly washed out with a solution of carbolic acid, one to forty. The bones were sutured together with wire sutures, and drainage tubes passed through the anterior flap around the joint and out through the popliteal space. To secure immobility the limb was placed upon a posterior splint, and plaster of Paris bandages applied from toes to groin, an interval being left at point of operation.

The first patient was a boy 16 years of age, with a rather poor family history. He had pulpy disease of both knee joints; in the right the tibia was dislocated backwards and flexed at a right angle with the femur. The right knee joint was excised in 1879, and the result was firm union of the tibia and femur with two inches shortening. At the time of dismissal from the hospital he had quite good flexion of the left knee, and was able to act as an assistant to a surveyor, which compelled him to do considerable walking. Last summer he fell and injured the left knee; this was followed by swelling and pains, and it has left that joint stiff in a straight position. Notwithstanding this he is able to get about very well.

The second patient was a girl 13 years of age, who fell and injured the left knee joint six years ago. The injury was followed immediately by swelling and pain, and six weeks subsequently an abscess formed, which was opened in Bellevue Hospital. She was subsequently a patient at Roosevelt Hospital, where several large abscesses formed about the joint and the lower portion of the thigh, and were opened. She left there considerably improved, but with the limb flexed at nearly a right angle. She subsequently was admitted to St. Mary's Hospital, where Dr. Poore operated upon her in

¹ Stated meeting, January 9, 1883.

May, 1882, by removing a V shaped portion of the lower extremity of the femur. There was considerable shortening after the operation, and there still remained a small external ulceration, but no exposed bone.

The third patient was a boy who had suffered from Pott's disease, and also had osteitis of the head of the tibia with abscess, which opened into the joint. Excision was performed in the usual way, and there was nothing peculiar concerning the subsequent progress of the case except that on the following day the temperature arose to 105.5° F., but fell to the normal within a few hours, and afterwards there were no unfavorable symptoms except the occurrence of a small slough upon one side of the joint, for which Dr. Poore was unable to account. In this case there still remained a small sinus into which a probe could be introduced, but he was unable to detect any rough bone. In all the cases the wounds healed promptly, and all the patients were up on the fortieth day.

FRACTURE OF THE CALCANEUM.

A specimen was presented by Dr. Stimson, which illustrated fracture of the posterior portion of the head of the calcaneum. He believed it to be probably the result of muscular action. The patient was a man fifty-three years of age, who was admitted to Bellevue Hospital in November last, for a disease of the tibia which required amputation. Eight years ago, while crossing the street, he was knocked down by a wagon and received the injury which the specimen illustrated. At the time the injury was received, the patient said that the skin was not bruised. The fragment was the portion to which the tendo-Achillis was attached, at least partially. It was more than an inch in length, and about three-fourths of an inch in breadth. On its outer side the periosteum was complete; on the inner side there was a growth of bone which presented the appearance of having been the result of reparative process. The fragment had united with the bone at its upper border, but was about half an inch anterior to its original position.

In reply to a remark of Dr. Bull, that he thought that pure muscular action could not produce this fracture; that it was the result of direct violence, Dr. Stimson remarked that there were several cases upon record, in which the fracture occurred as a result of muscular action. Dr. Peters

also referred to a case in which fracture occurred as a result of muscular action.

MELANOTIC SARCOMA.

Dr. Gerster presented a specimen of melanotic lympho-sarcoma which he removed from the neck of a man on the fourth of the present month. Three months ago the patient got heated from running about, and then sat down in front of an open window and was chilled. This was the only fact which he had been able to ascertain, concerning the cause of the growth, although he did not attribute much importance to it as an ætiological factor. Immediately after this occurred, the man noticed a slight swelling at the corresponding angle of the jaw, which gradually increased in size. There was no sore throat following the chilling nor nasal catarrh. The tumor continued to grow, and he consulted a physician who proposed to inject into it tincture of iodine. At that time it was about the size of an Italian chestnut. Considerable re-action followed the injection, the tumor did not resume its former size and shape, but continued to grow rapidly, and after three months it attained the size of a small orange. It was situated in the upper cervical triangle below the angle of the jaw. Laterally it was quite freely movable, not so vertically; and the skin over it was attached to the tumor. Dr. Gerster diagnosed lympho-sarcoma of rapid growth, and gave a grave prognosis. Removal was advised, the exsection was not difficult. Immediately after cutting through the skin, it was noticed that the mass had a peculiar dark color. On account of its appearance, and from the fact that through a slight puncture made by a hook introduced into its capsule for the purpose of lifting the tumor up, a black material exuded, he did not attempt to remove the tumor from the capsule, but dissected out the capsule and all, keeping well to the outside of the growth. At the lower and inner part of the tumor, where it approached the superior thyroid artery, there was a dense mass of connective tissue of recent inflammatory origin, which had attached the capsule to the blood-vessel, and also enclosed a small bundle of lymphatic vessels. Immediately upon the oozing of the black material, which presented the appearance of graphite mud, through the opening made by the hook, he removed the instrument and applied a ligature round

the point, carefully cleansed the part, and then proceeded to the dissection without further assistance of this kind. At the upper and outer angle of the jaw, a large number of lymphatic glands were found, which had exactly the characteristics of the tumor itself. They looked like a chain of small blue grapes, and burst as soon as touched. They were dissected away, together with some connective tissue by which they were surrounded. When the tumor was cut open it was found to contain a cavity in which there moved freely a black body that was surrounded by the dark fluid material already mentioned. Microscopical examination revealed that the growth consisted almost entirely of round celled pigmented elements with a very sparse stroma. The mass which was free in the center was doubtless the original swelling or lymphatic gland noticed first by the patient in the neck, it contained glandular tissue. The thick melanotic envelope enclosing this glandular body apparently represented the degenerated glandular capsule. The wound was closed by a few silver wire sutures and healed by first intention. Early recurrence of the disease is to be expected.

FIBRO-MYOMA OF THE SCROTUM.

Dr. W. T. Bull presented a specimen accompanied by the following history: H. C. F., forty-eight years of age and married, entered the hospital October 16, 1882. He gave no specific history; there was no history of cancer in the family; there was no history of traumatism. About twenty years ago the patient first noticed a small, hard lump, about the size of a marble, in the lower part of the right side of the scrotum. There was neither pain nor tenderness on pressure, nor discomfort of any kind. This mass gradually increased in size until two or three years ago, since which time it had grown much more rapidly. On admission he complained only of the weight and inconvenience. The scrotum formed a tumor as large as a child's head, the enlargement being on the right side. The skin was normal with large veins, the tumor was ovoid in shape, and reached upwards as far as the external abdominal ring, which was dilated and filled up, when standing, by a hernial protrusion as large as a goose egg, which could be easily returned. The surface of the tumor was smooth but uneven, and marked by several rounded projec-

tions which were semi-fluctuating. The right testicle was on its lower end, softer than the left, and apparently somewhat flattened, but movable in the tunica vaginalis. The circumference of the tumor at its upper limit was fifteen inches, at its lower part eighteen inches, and was of firm elastic consistence, and not at all tender. There was no pain either from it or the hernia. The patient had worn no support. There were no enlarged glands. Removal was advised. The parts were washed with a solution of carbolic acid, 1-40, after which ether was administered. Dr. Bull was assisted at the operation by Drs. George A. Peters and R. F. Weir. The hernial protrusion was put back and held, the tunics covering the tumor were dissected down to the capsule, and the cord exposed. A strong piano string was placed round the cord two inches from the tumor, and held by the forceps; the cord was then cut across about one inch from the tumor, and it appeared normal, but it was evident at once that with it had been cut across the lower end of the hernial sac, which was adherent to the surface of the tumor over a space as large as half a dollar. The blood-vessels were ligated with catgut, the wound in the peritoneum was united by continuous catgut suture, the regular portion of redundant scrotum was cut off with the scissors, a drainage tube was introduced, and the wound was closed with sutures of carbolized silk, sixteen to twenty in number. Iodoform, peat bags and absorbent cotton were used in the dressing. The patient was discharged from the hospital cured, November 13th. The hernial protrusion was diminished in size, and was retained by a truss. The tumor weighed three and a half pounds. It had been examined by Dr. Satterthwaite, who reported that it was a composite growth, consisting chiefly of ordinary fibrous tissue, to a less extent of fatty tissue, and to a still less degree of non-striated muscular tissue. It was situated behind the cord which was lengthened, but otherwise unaffected and above the right testicle, which was normal, as was also its tunica vaginalis. The origin of the growth was, apparently, from subcutaneous connective tissue, its outer layers forming a sac that was infiltrated with lime salts over most of the surface, while, where depositions were absent, there were small hernial protrusions of tumor substance.

DERMOID CYST OF OVARY.¹

Dr. F. Lange presented a specimen of dermoid cyst of the right ovary, removed from a patient thirty years of age. It contained a large mass of hair and some bone. One portion presented an appearance almost exactly like a piece of the scalp, and it was from this part that the hair took its origin. There had been a variety of opinions with reference to the nature of the tumor, but for the most part it was regarded as a solid growth, and in close connection with the uterus. At the time he saw the patient it had become quite clearly established that the tumor contained considerable fluid, and that probably the uterus had been entirely crowded to the left side, and that the growth did not have its origin in that organ. It seemed, by internal examination, that the tumor was situated in the broad ligament. The operation was very difficult, in consequence of the absence of a pedicle and the presence of extensive adhesions. Many ligatures were applied to the adhesions, which were cut in each instance with the actual cautery, and the wounds were powdered with iodoform. Although the operation lasted two hours the loss of blood was insignificant. The left ovary was also removed on account of cystic degeneration. It was of the size of a small hen's egg. Scarcely any reaction followed the operation; at no time did the temperature rise above the normal. He thought that the patient was out of danger. The operation had been performed eight days. It was the second dermoid cyst which he had removed within the last three months. The former was from a girl nineteen years of age.

ABSCESS IN THE LOWER PART OF THE FEMUR.²

Dr. F. Lange presented a patient, twenty-eight years of age, who had had bone abscess. When thirteen years of age, he was subject to osteitic affection of the femur, and, during the next six years, suffered from repeated exacerbations of the disease. The disease commenced with very severe pain, which lasted for one year; but not until the end of two years did a sinus open and some pieces of bone make their exit. At the end of six years, no operation ever having been performed,

¹ Stated meeting, January 23, 1883.

² Stated meeting, February 27, 1883.

all the sinuses closed, and the patient remained apparently well until last August, when he again began to suffer from severe pains without apparent cause, especially at night ; and when Dr. Lange saw him, in the beginning of October, he was very much reduced in strength, and presented that exhausted appearance and pale-gray complexion ordinarily seen with chronic bone abscesses. On examination the femur was found very much thickened in its lower half and somewhat thickened higher up. There was pain upon deep pressure in the region between the middle and the lower third of the thigh. The entire history of the case made it probable that central abscess of the bone existed ; and he, therefore, early in October, laid bare the bone, and bored into it in two places without finding pus, but, on making a third opening, pus discharged, and he then enlarged the opening and found quite an extensive abscess, the cavity of which was very narrow and made up of several lacunæ, one of which contained a small sequestrum. About half of the femur had to be chiselled, the thickness of the matter of the abscess reaching, in some spots, about an inch. The immediate surroundings of the pus cavity consisted of soft cancellous tissue pervaded by granulations and small pus cavities ; but to that a very thin necrotic bone substance followed. After the abscess had been evacuated and scraped out the soft parts were closely stitched together, two bone drainage tubes were inserted, and permanent antiseptic dressings were applied. During the next six weeks only four dressings were applied, and no accident happened except necrosis of the superficial fascia in the upper part of the wound ; there still remained some small openings, which were simply superficial and had no connection whatever with the cavity of the bone. The femur upon the affected side was about an inch and a third longer than the other. Furthermore, the position of the knee was in hyper-extension, and at the same time there was a slight amount of mobility in the joint, greatly to the discomfort of the patient, because it gave to him a feeling of uncertainty in stepping. To remedy this, to a certain extent, Dr. Lange had advised that an apparatus be worn which should fix the knee. During the past week pain had occurred again, but it differed entirely in character from that which the patient first suffered, and was shooting up and down the anterior aspect of the thigh. This pain had been relieved by the ad-

ministration of quinine, and besides the patient had a swollen spleen. At the time of the operation Dr. Lange entered the cavity of the knee-joint, which he found obliterated, but no unfavorable symptoms followed. An especially interesting feature in the case was the smooth healing of the bone cavity that followed complete sewing up of the soft parts with the after treatment adopted. The scar shows no depression, and is narrow on account of union by first intention through the greater extent.

OSTEOMYELITIS OF THE ILIUM.

Dr. Lange also presented a patient, sixteen years of age, whom he saw for the first time two years ago, and four weeks after the beginning of a severe illness with the formation of a large abscess on the anterior aspect of the iliac fossa. The hip joint was apparently not involved. He saw the patient in consultation with Dr. Moeller of this city, and made a number of incisions for the evacuation of pus. The case illustrated, that spontaneous separation of the epiphyseal junction might occur suddenly, as in the following weeks the patient's limb suddenly showed the deformity characteristic of fracture of the neck of the femur. A weight and pulley was then applied, and the great shortening which had occurred, was for the greater part removed. Six months after the beginning of the abscess, Dr. Lange performed necrotomy of the ilium, and removed twelve pieces of bone, mostly superficial, some of them central, especially in the upper part of the acetabulum. The patient made a comparatively speedy recovery. The position of the limb remained unsatisfactory, namely, in very great adduction, and without complete ankylosis. The weight and pulley was applied, and the limb brought down so that the difference in length between it and its fellow was not quite one inch, and with a corresponding elevation of the heel of the shoe on the affected side, the patient was able to walk very well. Since that time the adduction had relapsed, and Dr. Lange thought it would be best to let it go on, and after complete ankylosis had taken place to make section of the bone for the correction of the deformity. He had had three cases of acute osteomyelitis of the ilium, in two of which there was separation of the epiphyseal junction at the neck of the femur. In

one case he took particular care to avoid separation by applying a weight and pully, and yet the accident occurred.

EXTIRPATION OF THE LOWER PART OF THE RECTUM AND THE
ENTIRE COCCYX.

Dr. Lange also presented a patient from whom he had removed the lower part of the rectum for cancer, and to facilitate the operation, he had also removed the coccyx. The patient had been operated upon twice, the second time for recurring disease within the pelvis, in the depth of the ischio-rectal fossa. At the present time he has several suspicious glands in the inguinal region. He presented the patient to illustrate the comparatively good functional result which followed the operation, namely, he was able to control the discharges from the bowels perfectly, if the passages were consistent. Flatus escaped, however, without the control of the patient. The first operation was performed one year ago; the second operation was performed last October. The coccyx was removed at the first operation. At the second operation, he removed the mucous membrane to some extent on account of prolapsus. The removal of the coccyx at the first operation, facilitated operative measures very much. There was not much obstruction of the bowel before the first operation was performed. The patient was not aware of the existence of the disease until about six weeks previously, and yet he had extensive disease of the rectum. He had supposed that he was the subject of hæmorrhoids, and had been treated for that affection. The explanation which Dr. Lange gave of the ability of the patient to control the discharges from the bowels was, that the sphincter tertius had maintained its functions. It could be felt as a weak and soft somewhat incomplete closure, immediately above the new external opening.

Dr. L. A. Stimson remarked, that Dr. Lange's first case illustrated the importance of early attention to purulent disease within bone. He recalled a case in which he trephined the head of the tibia, in a patient fourteen or fifteen years of age, who had been suffering for eighteen months with recurrent attacks of pain in the shaft of the tibia, and thickening of the upper and middle thirds of the bone had developed. He localized the seat of maximum pain, tre-

phined at that point, and pus was found in the medullary cavity after passing through a layer of compact bone one-fourth of an inch in thickness. The operation was followed by rapid recovery which had remained permanent to this date nearly three years. At the time of the operation there was no sinus or discharge of pus, but the bone appeared somewhat thickened, and was sensitive, and the soft parts lying over it were thickened. On reaching the bone the periosteum was found thickened, and an abscess opened which contained from half an ounce to an ounce of pus.

Dr. Post remarked that in cases of persistent pain in the tibia confined to a limited space, a diagnosis of abscess was a pretty safe one to make.

Dr. L. S. Pilcher then read a paper on

THE USE OF LIGATURES IN WOUNDS OF VEINS.

In the discussion that followed, Dr. Post remarked concerning ligation of veins in stumps after amputation, that he had been accustomed to do so without hesitation, and had not known any injurious consequences to follow. He had had one case in which he tied the primitive carotid artery for a large telangiectasis involving one side of the face. The patient died with symptoms of pyæmia, although the jugular vein was not exposed. There was found at the autopsy thrombosis of that vessel, and embolic inflammation of the lung. The vein also contained a phlebolith. He had also met with one fatal case of phlebitis following the use of pins in the treatment of varicose veins of the thigh.

Dr. Gerster had applied the lateral ligature to the internal jugular vein in a case of multiple lymphoma of the neck. A row of catgut ligatures was applied to a longitudinal slit, and primary union followed the operation. He had also ligated the internal jugular vein in the course of exsection of tumors of the neck in four instances. In some of these cases he applied simply a double ligature. In two instances, however, he was obliged to exsect considerable portions of the vessel, and in one case death followed exsection very shortly. The case was one of those where it is impossible to determine whether death was caused by incipient acute septicæmia or shock, a post-mortem was made, but it did not reveal any positive evidence as to the cause of death. The central portion of the vein did not show any septic changes

which could serve to explain the termination of the case.

In one case he had exsected a very large venous plexus, situated near the scroto-femoral fold, mainly on the inner surface of the thigh, in a powerful young baker who was prevented from attending to his daily business by the severe pain which the growth produced. It was a convolution of varicose veins, some of them very large, covering an area of about ten square inches. In that case he removed the entire mass, and proceeded as in the exsection of a very vascular tumor, applying double ligatures, about sixty in number, and cutting the vessels between them. Some of the branches of the vessels penetrated through the fascia into the muscular structure, and were removed with portions of connective tissue and of muscle *en masse*. Union by first intention occurred in this case, and no further trouble was experienced. The chromicized cat gut ligature was employed.

Dr. Lange referred to a case already reported to the society, in which he applied the lateral ligature to the internal jugular vein accidentally opened in the attempt to tie the common carotid artery for secondary hæmorrhage. In that instance air entered the vein. The ligature used was antiseptic silk and recovery took place, and he subsequently presented the patient to the society.

VESICAL CALCULUS WITH A PIECE OF SILVER WIRE FOR A
NUCLEUS.

Dr. J. C. Hutchison presented a vesical calculus which he removed from a boy fifteen years of age, and upon whom he had operated ten years ago for stone in the bladder. The first operation was that of median lithotomy, in which he wounded the rectum, and a rectal fistula followed and continued up to the time of the second operation. He made several attempts to close the fistula, twice by inserting silver wire sutures, two or three times by touching the margins of the fistulous opening with nitric acid ; but, in all instances, unsuccessfully. The last attempt to close the fistula by sutures was about a year and a half ago. The case was left under the charge of the house surgeon, who was requested to remove the sutures at a certain time, and he did so. The boy, however, was never comfortable after this operation, but always complained more or less of pain in the bladder. Urine

continued to pass through the rectum, but the opening was very small. On the first of February last, Dr. Hutchison examined the bladder very carefully with the sound, symptoms of stone having presented themselves, and detected a calculus. On the following day he performed the medio-bilateral operation, and found the stone adherent to the posterior part of the bladder so firmly that he was unable to detach it with his finger; but, by taking a piece of flexible wire and making a loop, he was able to remove it. On examination he found the nucleus was a piece of silver wire. The interesting features in the case were: First, the wound of the rectum, not a common accident in lithotomy; second, the difficulty in closing the fistula; third, the accident of dropping a suture into the bladder which formed the nucleus of the calculus; fourth, the difficulty of detaching the stone from the wall of the bladder at the time of the operation. After the last operation the perineal wound was kept open for twelve days, and the edges of the fistula were again touched with nitric acid. The wound was kept open by introducing through it a catheter, allowing the tip of the instrument to remain just in the neck of the bladder, pushing it forward occasionally to withdraw the urine. This was done with the hope that the fistula might close, and he was of the opinion that union had taken place.

Dr. Post mentioned that Dr. Kearney Rogers operated a large number of times for vesical calculus, and frequently wounded the rectum, but no bad results followed in any of his cases.

Dr. Briddon remarked that wounding the rectum was not so infrequent as was generally supposed. It had occurred once to him in eighteen lithotomies.

Dr. Markoe remarked that wounding of the rectum with the *median* operation was quite unusual. He had operated by the median operation some thirty-four or thirty-six times, and had never had an accident of that kind.

Dr. Hutchison remarked that this was the only case in which he had performed the median operation.

EDITORIAL DEPARTMENT.

ON KNOCK KNEE.

Nowhere have greater achievements been obtained in late years than in the surgical treatment of deformities. So rapid, indeed, has been the advance in this once neglected department of surgery, that we may with reason hope that the next generation will be spared the sight of the numbers of hopelessly deformed creatures now so common with us. Yet this time of activity and progress is not without its dangers. We are too ready to accept what is new without carefully weighing its merits, and to cast aside the old as something that is past, without waiting to see if we really have profited by the exchange. There is a growing admiration for brilliant operative procedures and immediate, tangible results that is working lasting harm. The knife may cut a tendon, or the chisel may sever a bone, and the result is immediate reposition of the deformed member. But it is not so much the speedy correction of the deformity, as the final utility of the limb, that the orthopædic surgeon should aim to secure. And in many cases the slow way has proved to be the sure and the better way.

A little book full of comfort and encouragement to those who hold these conservative views, has recently appeared from the pen of Dr. W. J. Little, on *In-Knee Deviation, Its Relation to Rickets, Its Prevention And Its Treatment, With and Without Surgical Operation*. (8vo, Longman, Green & Co.,—London, 1882. pp. 161. 8vo, D. Appleton & Co.—New York, 1883. pp. 161.) Dr. Little was the first one who ever wrote a systematic account of knock-knee, which he did nearly forty years ago in the *Lancet*. It was therefore with pleasurable anticipations that we took up this monograph, containing the conclusions of a life-long experience tempered by the mature judgment of one, who, while of strong convictions is yet wedded to no unchangeable theories, but has shown himself ready to adopt any methods that have proved to be of utility. And we were not disappointed in our expectations. The author's

style is easy and pleasant, and his mode of argument is at once lucid and convincing. Although with a vast experience to draw upon, he has not confined himself to that alone, but has made a liberal use of the writings of others, among whom we were pleased to note the names of many workers in this country. Indeed, the book is inscribed to Professor Gross and to his medical and surgical brethren in America, and in many places the author acknowledges his indebtedness to his co-workers on this side of the water.

It is to be wished that the author had retained the old nomenclature of knock-knee, or genu-valgum. The term "in-knee" is sufficiently expressive, though not more so than "knock-knee," but it is superfluous and its frequent use grates unpleasantly upon the ear.

The author divides knock-knee, according to its etiology, into nine varieties, though more properly speaking, five of these are but sub-forms of the first. The first four he describes as "atonic, idiopathic, statical or uncomplicated genu-valgum, not rachitic, in infants hand-fed upon improper and too watery diet before or when beginning to walk." As sub-forms of the atonic variety are included knock-knee consequent upon debility following scarlatina and other fevers, or occurring in adolescents as a result of too rapid growth, too much standing or the habitual carrying of heavy weights; knock-knee in children congenitally weak, with congenital heart or lung trouble; that which results from over use of a sound knee in cases in which the opposite limb is shortened or wasted, and the deformity which occurs in fat, heavy children or over-stout and over-tall adolescents. The seventh form arises from partial paralysis or spasm in the muscles about the joint. Next comes the knock-knee of rickets, and lastly, that which results from strumous and rheumatic knee affections. The author strongly opposes the view, that rachitis is the principal cause of knock-knee, and grants to it only a subordinate rôle in the production of this deformity.

According to him, genu-valgum arises in by far the greatest proportion of cases, in consequence of a loss of tone in the structures surrounding the joint, a relaxation of the muscles or ligaments. due to a variety of causes—not rachitic—which produce general debility. He says:

"We have shown that from disordered, or probably rather from insufficient nutrition of tissues, both ligaments and mus-

cles suffer from diminished tone and strength, and that genu-valgum arises more often from loss of tone than from any other single cause. Nevertheless, pathologists, when treating of this distortion and of distortions in general, except as regards scoliosis, miscalled lateral curvature, have seldom taken atony of fibrous and muscular structures into account. The popular term weakness has taken its place.

"Atonic genu-valgum is related to several other disorders in which weakness of fibrous structures (including muscular weakness, short of paralysis) exists, *e. g.*, prolapsus ani, prolapsus uteri, ectopium senile, hernia, flat-foot, etc. Those complaints which depend upon muscular weakness (atony) have more attracted the notice of pathologists than those in which weakness of ligaments plays the more important part. This oversight as to the important part played by atony of the fibrous structures and muscles is partly due to the positive material tendency of pathology during the last four or five decades."

A strong argument advanced by Dr. Little in proof of the non-rachitic origin of knock-knee, in many cases at least, is one derived from the age at which the deformity may develop. "A positive proof that the atonic condition of the fibrous structures is a different disordered condition from rickets, appears to be afforded by the fact that the in-knee commonly called statical * * * *originates* where the growth is most rapid, not only in early infancy and childhood at the age and during the years in which rickets invariably begins and ends * * * but many originate also between the ages of five and twelve, and especially often during the second fast-growing period which precedes puberty (age twelve to sixteen or seventeen) when rickets does not originate. * * * We are aware that several most able men believe they have seen rickets originate during adolescence, because they have seen statistical, non-rachitic knock-knee produced at that period, but they have assuredly been mistaken."

Admitting fully the strength of Dr. Little's arguments in favor of the atonic origin of many cases of knock-knee, and agreeing with him that too great importance has been conceded to rickets as the main factor in the production of this deformity, we yet think that he goes too far in his rejection of this disease as a frequent cause of genu-valgum. When so able an observer as Macewen attributes it almost exclusively

to rickets, we may be pardoned for not accepting in their entirety the views as to the cause of knock-knee advanced by the author.

A point of practical importance in the morbid anatomy of genu-valgum, and one upon which the author dwells at length, is the relation of the various osseous surfaces of the joint to each other. Dr. Little asserts, in opposition to most writers upon this condition, that the changed relation of the leg to the thigh is due less to an enlargement of the internal condyle of the femur than it is to a wasting of the external condyle, and of the external articular surface of the tibia. It is to this wasting of the external part from pressure that he attributes the progressive increase of the deformity in patients who have received no treatment, or have been badly treated. The enlargement of the internal condyle is, in his opinion, pathognomonic of no form of knock-knee.

Excellent as is every part of this monograph, the most useful, and that which deserves the most careful attention, is the section upon treatment. As before remarked, we regard the tendency toward the operative treatment of surgical deformities, which is so pronounced in our times, as mischievous and as calculated to work irremediable harm if not checked. We do not wish to be understood as condemning operation in old cases of inveterate knock-knee, indeed we believe that osteotomy has proved a blessing to numbers of sufferers from this incapacitating deformity, but we do contend that it should be reserved as a dernier resort for those obstinate cases, few in number, which have resisted all milder measures. Hence it is especially that we welcome this book. It is not the work of a violent partisan, stubbornly adherent to his own views and rejecting with specious arguments, or totally ignoring, the proofs advanced by those of different opinions. Dr. Little has, as he states in his preface, sifted the writings of others and with the facts thence obtained interwoven his experience of the last four decades, and the result has been the production of a book which is an authority as regards the principles of the treatment of knock-knee.

The author regards knock-knee as readily amenable to treatment and states that he has met with but two cases, in any age, condition of life, or degree of deformity, that had been successfully rebellious to restoration, as far as the actual knee inversion was concerned. In some cases of rachitic cur-

vature of the thigh or leg in which eburnation had taken place, he concedes that a perfect straightening of the limb by mechanical means alone, is impossible, and it is in these cases, and in these alone, that he thinks that Macewen's operation is justifiable. *Arte, non vi* is his rule for the treatment of all deformities, and it is a rule that should be adopted by every orthopædic surgeon who aims to cure his patients, and not merely to temporarily correct their deformities by a rapid and brilliant procedure.

The cause of failure in so many cases of knock-knee treated by mechanical means, Dr. Little very justly insists, is the evil custom of sending the patient to the instrument maker with a prescription for a knock-knee brace, and leaving to the mechanic the adjustment and appliance of the apparatus. He urges upon surgeons the necessity of applying the instruments with their own hands, and of being responsible themselves for the mechanical treatment. It is only thus that the treatment of deformities can be successfully carried out, and when it is universally done the necessity of operations for the relief of inveterate cases of genu-valgum, become so through neglect of scientific mechanical treatment, will grow more rare. The permanent cure of a properly conducted case of knock-knee, the author believes, results from the growth of new osseous tissue to fill up the gap caused by the separation of the external articular surfaces, and not from absorption through pressure of the internal condyles. His method of cure is by gradual, gentle, well regulated re-position of the parts by means of properly adjusted mechanical supports, and he deprecates the employment of any undue force.

It is gratifying to our pride as Americans to observe the credit Dr. Little accords to the labors of American surgeons. He refers to their writings in many places throughout the book, and also quotes largely from a lecture by Shaffer on knock-knee, printed in the *American Journal of Obstetrics and Diseases of Women and Children*, for July, 1881. It is interesting to note the numerous points of agreement between these two observers, in different countries and working independently of each other, upon both the pathology and the treatment of this deformity. The monograph and the lecture might almost have been written by the same hand, so fully are they in accord upon the most important points.

In concluding this hasty review, we can but recommend Dr.

Little's book to all who ever have occasion to treat disease in children. It is to the general practitioner, especially, that the methods of treatment therein contained will be most useful, for the cure of knock-knee is easy in the earlier stages, before it usually comes under the care of the orthopædic surgeon, and it is precisely in the treatment of the early stages that the author's recommendations are most practical.

THOMAS L. STEDMAN.

STEIN ON TUMORS OF THE BLADDER.¹

Apropos of the recent revival of interest in the subject of removal of neoplasms from the bladder, inaugurated by Thompson's paper before the Royal Medical and Surgical Society, and of the rapidly increasing number of cases reported in societies and journals here and abroad, it seems well to call the attention of our readers to this little monograph of Dr. Stein's, which contains, in a compact and well arranged form, everything of practical interest to one who is desirous of rapidly familiarizing himself with the subject. A personal experience with four cases of vesical tumor induced the author to carefully explore the literature of the subject, and his Bibliographical Index is very full and valuable to the student of genito-urinary diseases, covering the period between 1747 and 1881.

The first thirty-six pages are devoted to a concise description of the gross and histological appearances of vesical growths, and contain some original drawings by the author. The interesting question of primary cancer of the bladder is dealt with at some length, and results in the conclusion that vesical cancer, frequently as it is found in both sexes as a *secondary* deposit or extension from adjacent organs, occurred fifteen times as often in women as in men, although the percentage of *primary* cancer is 12 per cent. in the latter to 75 per cent. in the former. Of all forms of cancer, epithelioma, of course, ranks first, both as a primary and secondary affection.

The section on diagnosis is very practical, and contains many hints which cannot fail to aid in the detection and explanation of obscure symptoms in these cases. Fibrinuria,

¹ A Study of the Tumors of the Bladder, by Alex. W. Stein, M.D. William Wood & Co, New York.

first described by Ultzman, is regarded by the author as a symptom of considerable importance, occurring in one of his own cases of villous cancer. While not denying the value of the microscope as an aid to diagnosis in rarely favorable cases, its liability to mislead is pointed out, and reasons given for preferring the testimony adduced by other means.

The usual (and some unusual) methods of physical examination are carefully described, the remarks on dilation of the female urethra being particularly full and judicious. Published, as the volume was, just before Sir H. Thompson called the attention of the profession to the value of perineal urethrotomy as a means of *diagnosis* in vesical tumor, no mention is made of it. A description of the method would be an important addition, and one we shall hope to see made in the next edition of the work.

Following the general body of the work is a list of thirty-four cases of removal of tumors of the bladder, twenty-three occurring in the female and eleven in the male.

As a résumé of the important features of each case is given, an excellent basis is afforded for comparison of the different method. of treatment and their results.

Founded on this comparison, certain principles governing all operations on the bladder are adduced and lines of treatment enunciated. The value of thorough and well-planned drainage in influencing the results of cystotomy, and the different means of securing it are dwelt upon, and conclusions reached which, when tabulated in the form of axioms, form an appropriate ending to the work.

By those who believe in intelligently applying to the bladder the principles now governing us in abdominal and peritoneal surgery, the book will be received as a valuable contribution to the surgery of that organ. It is certainly an advance upon the policy of non-interference so long advocated by authors and teachers, and finds in that fact, if in no other, a sufficient *raison d'être*.

F. W. ROCKWELL.

RANNEY ON THE APPLIED ANATOMY OF THE NERVOUS SYSTEM.¹

The labor undertaken by Dr. Ranney in preparing the course of lectures which are reported in this volume, is most important. It will be of great advantage to the cause of scientific medicine, and will, particularly, be of use in putting many of the facts of Neurology before the general medical reader in an interesting and instructive form, enabling him to get an idea of the results that have been reached by scientific neurologists.

The profession as a body seem not to be aware that this department of medicine has reached a pretty high state of development. The best contributions to it are only to be found in special journals, many only in the French or German periodicals, while the popular books on subjects connected with diseases of the nervous system have formerly been, and still are, to a great extent, of such a character as to prejudice careful men against the entire subject. It is time that those who are not aware that many diseases of the brain and spinal cord can be diagnosed as certainly as those of the heart and lungs, and with much greater accuracy than most affections of the abdominal viscera, should be informed of the fact. The basis for the accurate diagnosis and systematic study of this class of diseases is given by Prof. Ranney in the work before us.

The plan of the author is to give a description of the structure and relations of these organs, bringing out facts which are of interest to the physiologist, and showing the *rationale* of the symptoms—groups which indicate lessons in particular localities. It is, in fact, very largely, an introduction to the subject of "localization," a subject which, under the treatment of Charcot and others, has become to Neurology what "physical diagnosis" is to the study of the diseases of the thoracic viscera.

In pursuance of his plan, Prof. Ranney has divided the work into four parts, viz.: Part I., The Brain; Part II., The Cranial Nerves; Part III., The Spinal Cord; and Part IV., The Spinal Nerves. In each part after describing the special organs, he gives us some account of their physiology and such

¹ The Applied Anatomy of the Nervous System; by Ambrose L. Ranney, A. M., M. D., etc. New York, D. Appleton & Co., 1881.

of their relations to clinical medicine and surgery as are well ascertained. The functions of the brain and its different organs are well stated in the first part. The second part, which is devoted to the cranial nerves, is full of valuable information for the student. The next section, which deals with the spinal cord, will be of the greatest advantage to students and practitioners who wish to obtain more information in regard to its complicated anatomy and functions than can be obtained from any of the English or American text books. It gives an introduction, not only to the pathology, but to the terminology of spinal diseases. The treatment of the spinal nerves in the fourth part is less interesting, but still instructive.

From lack of space we are unable to give a critical examination of this interesting book; we can only say that the author has done a good work in preparing it. He can be trusted to correct any errors that may have crept in, in a future edition.

B. F. WESTBROOK.

ERRATUM.

The cuts on pages 287 and 288 of the issue of June, illustrating the article of Dr. Fowler upon the use of an elastic ligature for the removal of an angioma of the scalp, should be transposed, Fig. 3 being Fig. 2, and *vice versa*.

THE LATERAL CLOSURE OF INCOMPLETE VEIN-WOUNDS.

By LEWIS S. PILCHER, M. D.,

OF BROOKLYN, N. Y.

ANATOMICAL AND PHYSIOLOGICAL CONSIDERATIONS.

IN some instances the treatment of vein-wounds may justifiably differ from that which would be imperative for wounds of arteries of the same importance. Such variations are dependent upon the differing anatomical and physiological conditions of the two classes of blood vessels, and also upon the different course which, in consequence, their repair may take.

In the case of veins, the greater thinness of their walls causes them as tubes to be more flaccid and to collapse spontaneously when empty, while the more languid and even flow of blood through them, and the freer collateral circulation, reduces greatly the force by which they are distended by their contents. Penetrating wounds of their walls have little tendency to gape. From these circumstances, apposition of divided surfaces is more readily secured and maintained in them, as a class, than in similar wounds in arteries, and the provisions of "rest" during repair are less likely to be violated.

As a consequence, the repair of vein-wounds is often rapid and perfect, and union of incomplete wounds may even be accomplished in many cases without obliterating the canal of the vessel. Such a result, as a rule, is obtained in cases of longitudinal wounds of su-

perforial veins, when the treatment is confined to the application of simple external compression. The pressure of the compress suffices to exclude the column of blood from the wounded region until adhesion of the edges of the wound in the wall of the vein has taken place. Upon the withdrawal, then, of the compression, the blood resumes its course through its previous channel.

In the case of wounds partially dividing a large and deep-seated vein, the size of the vessel, and the flaccidity of its walls, may permit the edges of such an incomplete wound, and some of the adjoining inner tunic, to be brought together and held in apposition by ligatures, sutures, or clamps, until firm adhesion has taken place, without interruption to the flow of blood through the vein at any time. No such thing is possible in the case of any arterial wound.

For the purpose of obtaining more definite data upon which to base the employment of the ligature in treating vein-wounds, I made a number of experiments upon goats during the year 1882, using aseptic catgut as the ligature material, and observing the precautions of antiseptis in the after-treatment of the operation-wound. My experiments included three ligatures of the internal jugular vein and two of the femoral vein. A more full account of these experiments has already been published.¹ In none of these experiments did a thrombus form on either side of the ligature, which was applied in the continuity of the vein, except in one case, in which special effort was made to secure one by applying a second ligature to the vein, swollen with blood, a little more than an inch above the first one. The part of

¹ The Use of Ligatures in Wounds of Veins, *Medical News*, Phila., 1883, xlii., 278.

the vessel between the two ligatures having been left filled with blood, a thrombus was obtained. The specimen was removed on the ninth day. In this case the clot was found to have simply mechanically distended the tunics of the vessel, making the study of the conditions presented by the tunics more easy, but not modifying the character of the reparative process. It was an unirritating injection-mass that was awaiting invasion and appropriation by active cells from the adjacent tissue. The series of specimens obtained in these experiments, when examined, demonstrated that marked proliferation of the tissue-cells of the tunica intima had been excited, the activity of this proliferation being greater as the point where the vein-walls were constricted and approximated by the ligature was approached. The accumulation and confluence of the mass of cells in the cul-de-sac formed by the vein-constriction, the subsequent extension of the capillaries into them, and the consequent conversion of the new tissue into connective tissue, were the successive steps by which permanent closure of the tied veins were effected.

These reparative changes, provoked by the application of the ligature, may be regarded as having had, as their first object, the restoration of function in parts whose nutrition had been disturbed by the original application of the ligature. But the agent which had disturbed the nutrition of the tunica intima, and provoked a more active metamorphosis and proliferation of its cell-elements, had at the same time held the vein-walls in coaptation until the confluent plastic material formed had attained sufficient mass and tenacity to permanently unite them together. Essentially the process is that of the formation of a cicatrix, and in its course the ligature plays the same part as does the suture in ordinary wounds—that of maintaining coaptation

until firm adhesion is secured. There may be seen in this, also, the same process as that by which a simple longitudinal slit in a vein-wall may be repaired without obstruction to the current of blood through the vessel, the edges of the slit themselves furnishing the material for its repair, the amount of which material, if only further irritation or traumatism be withheld, being strictly limited to the reparative needs of the injured structures.

A wound in the wall of a vein determines in the wound-borders the same circulatory and nutritive changes which follow similar injuries to other organs of the body. The practical difficulties which may complicate the course of the vein-wound, and render abortive the natural attempts at repair, spring from the special function and anatomical character of the organ.

In the first place, the pressure of the fluid which fills its cavity is a constant force tending to separate the edges of the wound, while the escape of this vital fluid constitutes a danger which must be prevented at the sacrifice, if need be of the functional activity of the organ itself. In the second place, the thin walls of the organ do not present sufficient surface, when wounded, for securing perfect and reliable apposition of the edges of the wound; while in the case of large venous trunks, even if such apposition were possible, the delicate cicatrix would not be able to sustain the pressure of the blood column which fills the interior of the vessel.

To assist him in overcoming these obstacles, the surgeon finds an excessive exudative activity in the adjoining intima awakened by the injury, which may be taken advantage of to secure the required extent of surface. By the apposition and adhesion of this, the aperture in the wall of the vessel may be securely closed. When, therefore, the surgeon interposes to secure by ligature the

certain accomplishment of the conditions by which a vein-wound shall be closed, the apposition of the cut edges are disregarded, and the apposition of the adjoining intima sought for. A clot, however important it may have been in securing primary arrest of the bleeding, is but an embarrassment in the after processes of repair—when formed it provokes the obliteration of the channel which it occupies, but it plays no necessary part in the reparative changes which result in closing the original wound-aperture.

It is important to remember that the proper relation of a ligature to the healing process that closes an aperture in a blood vessel, is simply that of maintaining apposition. From the standpoint of the hæmorrhage, for which it was first applied, it is a means of compression, and as such should have been applied with a firmness that shall prevent its becoming detached; from the standpoint of repair, it is a means of apposition, a circular suture; as such, it should be unirritating, neither suppurative nor ulcerative inflammation should be provoked by it; it should not interfere with union by first intention, either of the wound in the vessel, or of the wound in general, but it should be capable either of remaining passive in the tissues in which it is imbedded, or, preferably, of becoming spontaneously absorbed after its function is accomplished.

INDICATIONS FOR TREATMENT.

These considerations have an important practical application in determining the propriety of substituting a lateral ligature, or a lateral suture, for ligatures encircling the entire vessel, in the treatment of wounds involving but a part of the wall of a great vein.

The different indications for treatment, in the case of

wounds of large veins, that have presented themselves in the course of the foregoing anatomical and physiological résumé may be set in order, as follows :

1. To prevent the escape of blood.
2. To maintain the wound-edges and the adjoining intima in apposition.
3. To avoid the formation of a clot.
4. To preserve the function of the organ.

The question at issue is : To what extent can a ligature or suture, not encircling the whole tube, be relied upon to satisfy these various indications ?

The primary escape of blood may be arrested, when an incomplete wound of a large vein has been sustained, by grasping the edges of the wound by forceps, and throwing a thread around the adjoining parts, as the opening of a bag is encircled by a string, and firmly tying it. This constitutes *lateral ligation*.

The edges of the wound may be permitted to remain in the grasp of the forceps, which, as a clamp, may retain them in apposition till primary adhesion of the apposed tunics has taken place with sufficient firmness to prevent further escape of blood. This constitutes *lateral forcipressure*.

If the wound is a longitudinal slit too extensive to be grasped by a single ligature, or if the wall of the vein be not sufficiently lax to permit of its being puckered up enough to be securely grasped by the ligature, further hæmorrhage may be prevented by sewing up the wound by a continuous suture. This constitutes *lateral suture*.

Secondary hæmorrhage may result from carelessness in the original application of the ligature as the result of which it may slip and permit the wound to reopen. Such defective application of a thread is more likely to be made in the case of a lateral ligature than when the whole circumference of a vessel is grasped in the loop. No lateral liga-

ture should be left in place the security of whose hold on the tissues grasped by it is not absolutely certain. Secondary hæmorrhage may result, again, from the use of an irritating thread for the ligature, which produces ulcerative absorption of the tissue grasped by it, and provokes suppurative inflammation in the tissues adjacent to it. When in the loss of tissue caused by such a ligature, the new cicatricial tissue has been greatly weakened, or itself has been wholly broken down, secondary hæmorrhage will occur, since there is no thrombus present to occlude the vessel and plug the opening caused by the slough. The use of such an irritating ligature, therefore, would be hazardous in any case. The extension of sloughing, due to septic infection of the wound as a whole, may likewise cause secondary hæmorrhage. For the same reason as in the preceding case, there would be a greater liability to this complication if a lateral ligature had been applied, than if the entire circumference of the vessel had been included in the ligature.

To sum up : Lateral closure of a vein-wound will effectually arrest primary hæmorrhage. Lateral closure, effected by an unirritating material, accompanied by adequate antiseptic treatment of the general wound is not exposed to dangers of secondary hæmorrhage. Lateral closure by an irritating thread, and without adequate antiseptic cares, is more likely to be complicated by secondary hæmorrhage than is terminal ligature.

The three other indications require but brief consideration. The rent in the vein-wall is virtually transformed by the application of the ligature into an extravascular injury, and their fresh surfaces are brought into apposition with the surrounding tissues when the wound is closed, and share in the general repair there effected. The tissues of the puckered wall of the vein, in the grasp of the ligature, are placed in the same condition as that which characterizes

veins when ligated in their whole circumference. No clot is required, nor formed, by its insufficiency, or its disintegration to become a source of danger. That the process of exudation and complete organization of the plastic material, that fills in and effaces the irregularity produced by the application of the ligature, should proceed undisturbed to its conclusion, demands simply that the general precautions for securing wound-repair be observed. The ligature acts as an unirritating reinforcement, that prevents the rupture of this material during the yielding period of its history, and itself is finally disintegrated, and is removed in the course of the ordinary tissue-changes of the part.

CLINICAL HISTORIES AND STATISTICS.

Lateral closure has been attempted in wounds of the internal jugular, the external jugular, subclavian, axillary and femoral veins. According to Nicaise,¹ it was employed for the first time by Travers, in 1816, in a case of lateral wound of the femoral vein. The patient died from hæmorrhage. (Malgaigne—Med. Operat., p. 115—says the cause of death in this case was phlebitis. I have not been able to re-examine the reference myself). According to the same author, Roux lost two patients from overwhelming hæmorrhage in consequence of the premature separation of a lateral ligature that he had placed on the internal jugular vein.

Braun,² from all the publications accessible to him, compiled, in 1882, twenty-nine cases of lateral closure of veins—twenty-four by ligature, three by forcipressure, and two by suture. These include the cases of Travers and Roux mentioned above. Successful results were obtained in sixteen cases of ligature, one of forcipressure, and one of suture. In one case of ligature and one of suture, the

¹ *Des plaies et de la ligature des veines.* Paris, 1872, 109.

² *Ueber den seitlichen Verschluss von Venenwunden.* *Archiv für klinische Chirurgie.* Berlin, 1882, xxviii., 654-672.

suture proved inefficient, and was changed for other methods of treatment, after which recovery took place. There were nine deaths—two after forcipressure by pyæmia, seven after ligature, four of which were from hæmorrhage, and three from pyæmia.

The vessels operated upon, exclusive of the two cases in which a change of method was practiced, were :

Vessel	No. Cases.		Recovered.	Died.
Internal jugular	12	9	3	
External juglar	1	1	.	
Subclavian	1	1	.	
Axillary.	5	5	.	
Femoral	8	2	6	
	<hr/> 27	<hr/> 18	<hr/> 9	

The three deaths, in the cases in which the internal jugular was involved, were all from secondary hæmorrhage. Five of the six deaths, in the case of the femoral vein, were from pyæmia. With regard to these, the author remarks, that the disastrous results were due to the hospital influences to which the patients were subjected, and not to the particular method of treating the vein-wound. He further states that all the cases, eight in number, in which rigorous antiseptic precautions were adopted, recovered.

The two cases of lateral suture, which Braun reports, were, one case in which Czerny performed this operation upon the internal jugular, but was compelled, by the recurrence of hæmorrhage, to resort to acupressure; and one case, more fortunate in its course, in which the femoral vein was operated upon by Schede. He stitched up the rent in the vein with a fine needle and the finest of catgut. He then sutured also the sheath of the vessel. Union by first intention followed. To these cases may be added a case reported by Cheyne,¹ in which Mr. Lister, while removing some cancerous glands from the axilla, severed a small vein

¹ Antiseptic Surgery. London, 1882, p. 76.

at its junction with the axillary, making practically a longitudinal rent in the axillary vein. Taking a fine curved needle, and the finest catgut, he stitched up the rent by the glover's suture. The patient recovered without the slightest bad symptom.

From American surgical literature, it is possible to add to the foregoing nine other cases of lateral closure of vein-wounds—one of the femoral, and eight of the internal jugular—all of which terminated in recovery.

McClellan,¹ in extirpating from a gentleman's groin a large fibrous tumor which was wedged into the external crural ring and the femoral canal, and while detaching it from the femoral vein, found the saphena interna involved in the substance of the tumor, just as it emptied into the trunk-vein. He was obliged to divide it there; and afterwards, failing to restrain a tremendous gush of black blood by pressure, he pursed up the orifice by a spring tenaculum and Liston's forceps, and had a fine silk thread tied around the margin. This succeeded perfectly in restraining the hæmorrhage, and was followed by no inconvenience. He remarks that it was the largest venous orifice he ever saw ligatured, and that it was large enough to admit one of his ring-fingers.

Lidell,² who quotes the preceding, adds to it the following observation:

In a case seen by him some years ago, the internal jugular was punctured by the operator while engaged in dissecting out a deep-seated tumor of the neck. The margins of the puncture were drawn together and raised up by a Liston's forceps, and a ligature was tied around them on the side of the vessel. This proceeding was successful.

¹ Principles and Practice of Surgery, pp. 194, 195.

² International Encyclopædia of Surgery, iii., 199. Injuries of Blood-vessels.

Parkes¹ has reported three cases of lateral ligature of the internal jugular vein, followed by recovery in each case. In one of these cases the constriction of the calibre of the vessel, caused by the ligature, amounted to one-third, and in another to one-half its extent. No untoward symptoms followed in either case.

Allis¹ has reported, also, a case in which he applied a lateral ligature to the internal jugular vein, on account of a wound inflicted in it during the removal of a tumor from beneath the sterno-cleido-mastoid muscle. The recovery was rapid and permanent.

Gerster,² in a case in which a long longitudinal slit was made in the internal jugular vein, during the removal of a multiple lymphoma of the neck, succeeded in closing the rent by the application, laterally, of a row of catgut ligatures. The operation was followed by primary union.

Lange³ applied a lateral ligature, of antiseptic silk, to a wound of the internal jugular vein, accidentally inflicted in an attempt to tie the common carotid artery for secondary hæmorrhage. Recovery took place.

The writer has reported³ a case in which J. E. Pilcher obtained recovery, without complication, from a wound of the internal jugular vein, by lateral forcipressure. The wound was a suicidal stab with a dagger, which passed through the sterno-cleido-mastoid muscle, grazed the internal jugular vein, and finally penetrated the trachea. The wound was enlarged sufficiently to admit of identification of the vessel and the exposure of the opening into it, which was a simple slit in its anterior wall a quarter of an inch in length. A lateral ligature was first applied, but it slipped off. Hæ-

¹ Proceedings of the Philadelphia County Medical Society, meeting of March 8, 1882, in the *Philadelphia Medical Times*, July, 1882.

² Proceedings of the New York Surgical Society, meeting of February 27, 1883. *Medical News*, Philadelphia, 1883, xlii., 278.

³ The ligation of large venous trunks. *Philadelphia Medical Times*, 1882, xii., 664, 667.

mostatic forceps were then applied, which, perfectly arresting the hæmorrhage, were left *in situ*. They were removed on the second day thereafter. No further hæmorrhage took place. The wound healed by granulation.

APPRECIATION.

Sufficient experience in the lateral closure of vein-wounds has been now gathered to afford some grounds upon which to estimate its value, and to indicate its limitations, its possible dangers, and the precautions which should attend its use.

The advantages which attend this method of treatment are: that it may be more quickly done; it demands less extensive dissection and disturbance of the neighboring tissues; it increases the prospects of obtaining union throughout the wound by first intention; and, finally, that it preserves intact the function of the vessel.

Lateral closure has been condemned by most surgical writers in the past on account of the dangers to secondary hæmorrhage to which its use was presumed to expose the patient. Nelaton, Malgaigne, Nicaise, Langenbeck, Pirogoff, Weber, Fischer, Billroth, Gross, Agnew, and Markoe, may be mentioned among those who reject it. The condemnation of the operation by Malgaigne is very emphatic. His words are:¹ "The lateral ligature will be an operation always to be condemned," and, continuing, he adds: "for very extensive wounds of venous trunks, where compression is insufficient, the only resource is the ordinary ligature." The objection of this author was founded on the erroneous belief that permanent hæmostasis after a vein-wound depended upon the formation of a clot sufficient to occlude the entire lumen of the wounded vessel. In as much, therefore, as the lateral ligature in some cases might

¹ *Médecine Opératoire*. 1861, 114.

fail to provoke the formation of such a clot, when the ligature should come away in such cases, secondary hæmorrhage, he believes, would be inevitable in those cases. Gross¹ gives as the reason why lateral ligature should be discarded as an application to be used when a vein is merely nicked, pierced or partially divided, that "the operation is almost invariably followed on the detachment of the thread by fatal hæmorrhage." This objection is not sustained by the statistics presented in the preceding section of this paper. Among the thirty-two cases of lateral ligature analyzed there, secondary hæmorrhage occurred in but five. Four of these terminated fatally. One of these, at least, resulted from a faulty application of the ligature, since by its slipping off it was that the fatal hæmorrhage was produced. The three remaining cases of hæmorrhage were all cases in which the internal jugular vein was involved.

The objection upon the score of probable secondary hæmorrhage, as the anatomical and physiological considerations which have been described in a previous section of this paper show, is an objection to a particular kind of ligature material and of treatment of the general wound, not to lateral closure itself. A thread that must "cut through" and become detached, is a source of danger, greater in the case of its application to the side than to the circumference of a vein. Whether such a thread should ever be applied laterally must depend on whether the importance of maintaining intact the function of the vessel as a blood-conduit is great enough to justify the taking of some risk to secure it.

From this point of view, a marked difference exists between the internal jugular vein, and the trunk veins at the roots of the extremities.

The free collateral circulation through the intra-cranial venous sinuses, the superficial veins of the head and neck,

¹ System of Surgery. 1882, i., 814.

and the sinuses of the spinal canal, prevent serious discomfort from being experienced from the obliteration of the internal jugular vein notwithstanding its size. Both internal jugulars have been resected in the same subject¹ without other evil consequences than a temporary headache.

The risks of the use of a septic ligature, applied laterally, are greater in the case of this vessel than in the case of the axillary or femoral vessels. The normal blood pressure is subjected to greater variations ; whenever the head is elevated, whenever the free entrance of the blood into the thoracic vessels is impeded, as in coughing or straining at stool, this normal pressure is intensified. The movements of the head, even the act of deglutition, occasion a varying muscular pressure upon the vessel and affect the tension exerted by the blood-current within it. It is more difficult, impossible even, to immobilize the neck and head to the degree to which the extremities can be subjected, and thus the safeguard of rest is less fully enjoyed by it during the healing process.

For these reasons it would be less justifiable to practice lateral closure of the internal jugular vein with a septic ligature, or when adequate antiseptic treatment of the whole wound could not be carried out than in the case of the veins of the extremities.

The axillary and femoral vessels, on the other hand, cannot be obliterated without seriously disturbing the circulation of the limbs whose blood is discharged through them toward the heart. No free collateral channels have been provided for this flow, so that its arrest in the main trunk embarrasses necessarily both the nutrition and the function of the limb. This embarrassment is more commonly limited to persistent impairment of muscular

¹ Pilger. Ueber Resection von grossen Venenstämmen. *Deutsche Zeit. f. Chirurgie*, 1880, bd. xiv., 130.

power, varicosity of the contributory veins. œdema, and aching, but in some cases fatal gangrene has followed. The advantages of position, immobilization and compression can be perfectly secured in the treatment of wounds of these vessels. The normal blood pressure against their walls is much less than in the case of the internal jugular.

In the case, therefore, of the trunk veins at the roots of the extremities, the importance of preserving them from obliteration, and the more favorable conditions which they present to diminish the risks of disturbance to the healing of wounds in their walls, while the current of blood is active within them, justify the assumption of the risks of their lateral closure, even without the advantage of aseptic thread or attendant antiseptic treatment.

The introduction of aseptic ligature materials, and of intelligent antiseptic methods into the treatment of wounds, has made it possible to secure for wounded blood vessels conditions that are much more favorable for their rapid and undisturbed repair, than has hitherto been possible, and, in so doing, requires a reconsideration of some teachings that had their origin in the necessities of the more faulty conditions of the past. Such a reconsideration must be made as to the propriety of the lateral closure of incomplete vein-wounds.

By the primary union, or the union by granulation without septic disturbance, that antiseptic methods make certain, laterally closed vein-wounds are secured against those disturbances which have endangered their course in the past, and the liability to which has determined the condemnation of the lateral method of treatment.

The sum of the anatomical, physiological and clinical facts which have been examined, seems to me to teach the propriety in many cases, and the importance in some of

practicing lateral closure of incomplete vein-wounds. The following rules of practice I would submit for the acceptance of surgeons.

In every case of incomplete wound of a vein, attempt should be made to secure its lateral closure, and the preservation of its functional integrity, provided an un-irritating ligature or suture material can be obtained, and the wound can afterwards be kept from septic infection.

In cases of incomplete wound of a trunk vein at the root of an extremity, the lateral closure of the wound should be attempted, even though an ordinary thread be necessarily used, and perfect antiseptic cares be impracticable.

In cases of incomplete wound of an internal jugular vein, when ordinary thread must be used for its treatment, and perfect antiseptic cares are impracticable, the vein should be ligatured in its circumference above and below the wound, and the division of the vessel made complete.

A CLINICAL REPORT ON EXCISION OF THE HIP-JOINT.¹

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THIS paper is based on the experience in eighteen cases of excision occurring among the poorer classes and in hospital practice. They are not therefore to be compared with cases occurring among the better classes. Suppurative disease of the hip-joint, as far as my experience goes, has its origin in an osteitis, or osteomyelitis as it is sometimes

¹ Read before the New York Surgical Society, March 13, 1883.

called, of the head of the bone, the articular cavity being involved secondarily.

Ten cases occurred in girls and eight in boys. The youngest $2\frac{1}{2}$, the oldest 14 years of age. The disease had lasted from two to six years. Many of the patients had been under strict mechanical treatment for from one to four years without any effect on the course of the disease. Abscesses continued to form and discharge, so that in not a few patients the thigh and gluteal region were riddled with openings, from which pus continually flowed, while in others only one opening had formed. Excision was performed in all cases in the same way, with a long incision over the trochanter major, the tissues separated from the bone and the head removed, in thirteen cases above the trochanter minor, and in six below that point. In four cases, after some months, the end of the femur was re-excised.

The pathological conditions underlying the external symptoms mentioned above were as follows: In seven cases the disease was confined to the head of the bone, the shaft appearing healthy. In all these cases the cartilage had entirely disappeared, and in most, the head was represented by a tubercle, or lay loose in the cavity of the acetabulum. The shaft was diseased in eleven cases—by this I mean that the central cavity was enlarged at the expense of the compact tissue, so as in many cases to admit the finger. The external shell had in many places a worm-eaten appearance. The bone was of dark color, and so soft that a probe could be easily made to perforate it. In a few cases the cavity was filled with pus. The periosteum did not appear much thickened, but was easily separated from the shaft. The floor of the acetabulum was more or less diseased in all of the cases; it was perforated in four. It was extensively diseased in its upper and posterior border in nine. In two cases I have seen a perforation of the upper wall opening

upon the dorsum of the ilium, the external edge forming a bridge over it. In one case there was extensive disease of the pelvic bones. In short, they were all cases of advanced disease, and the pathological condition such as in other joints would call for excision.

The result in these eighteen cases was as follows: two are still in the hospital, leaving sixteen to be accounted for. Of these eleven died and five recovered—about thirty-two per cent. The cause of death was, from pure exhaustion, one; tubercular meningitis, one; septicæmia, one; phthisis, amyloid degeneration, seven.

In one of these cases the wound had entirely closed at the time of death.

Death did not take place in these cases for some time after the operation, varying from two months to four years. The immediate effect of the excision in these cases was an improvement in all respects. The patients were free from pain, increased in flesh, had normal temperatures, and most of them were able to be about; but the wound never entirely closed, except in one case. Sometimes only a small sinus was left. After a time an examination with a probe or finger revealed the upper end of the femur bare and rough, and from its cavity unhealthy granulations growing, and an examination of the abdomen in many showed the liver enlarged, together with disease of the kidneys. In some cases the end of the femur was re-excised; but the cut surface exhibited the same unhealthy condition. These patients died not from, but *in spite* of the operation.

Of the five patients in whom recovery took place, and by this I mean that the wound entirely closed and no sinus remained open, and the child had use of the limb, the disease had existed six years in one, three years in one, and two years in three cases. In all these patients the family history was comparatively good. In two cases at the time of the

operation there was enlargement of the liver; in one of these albumen in large quantities was present in the urine, and the patient had had two quite profuse hæmorrhages from the lungs. Section was made one inch below the trochanter minor on account of profound disease of the shaft; yet recovery took place. In the other case the disease was confined to the head of the bone.

In regard to the permanency of the cure. One case was heard from five years after leaving the hospital. He was going about and had use of the limb. One I examined six years after. He was well, and had been following the occupation of an express driver. One was seen eighteen months after his discharge, and was well. The other two cases I have lost all trace of.

In regard to the amount of shortening. In these cases it varied with the duration of the disease and its extent and the point of section. In four cases it was as follows: three-quarters of an inch; one and one-quarter at time of discharge, one and three-quarters eighteen months later; seven inches five years after leaving the hospital; two inches.

The elements going to make the shortening after excision of the hip-joint are: first, the amount of bone actually removed; secondly, the amount of atrophy of the whole limb from disease and disuse; and thirdly, the amount of stretching of the bands holding the end of the bone to the pelvis. Three of my cases walked well without either crutch or cane. One with seven inches shortening cannot afford to keep himself provided with a high shoe, although he can bear his weight on the limb. He therefore uses a crutch.

In referring again to the cause of death, it will be noted that, in all but two patients, it was due to diseases secondary in their nature—namely, amyloid degeneration, tubercular meningitis and phthisis. The deaths from septicæmia and

exhaustion were due, one to the operation, and one to the joint disease. All the patients having amyloid disease belong to families having a marked tubercular diathesis. In some cases this change in the abdominal organs came on early, in others late, after suppuration had made its appearance. It would seem that from a study of these cases, and others in which no operation had been done, that there is a marked predisposition among children of tuberculous parents to become thus affected in the course of hip-joint disease. I have never seen a case that was not so connected, and it would seem that the more profound the hereditary influence, the earlier these changes appeared.

Two of the patients operated upon had, at time of excision, marked enlargement of the liver, and one, albumen to a large degree in his urine, yet both recovered, and on examination made five years later, the liver was found of normal size, the albumen having disappeared shortly after the operation.

I have never seen a true dislocation of the head of the bone, on to the dorsum of the ilium.

The questions that naturally suggest themselves from a study of these cases are: *First*, was a cure by mechanical and expectant treatment probable? *Secondly*, What are the indications for excision of the hip joint?

In regard to the first, I am clearly of the opinion that a spontaneous cure was not probable. The fact, that, in those cases that proved fatal, after an excision, the patients improved in all respects for a time, varying from six months to over a year, and that they finally died of secondary disease, would seem to corroborate that opinion. I think that an earlier operation would have diminished the rate of mortality.

In regard to the second question concerning the indications for excision, I think that it is more difficult

to lay down any rules. In cases giving a good family history, much can be done by mechanical treatment, and I do not think that an early operation is called for. But in patients belonging to families of marked tubercular ancestry and in hospital practice, I think that the question of excision should be considered soon after abscesses have made their appearance, as there seems to be a kind of malignancy in these cases.

The presence of amyloid changes is not a bar to recovery, but is a very serious complication.

A CASE OF DISLOCATION OF CERVICAL VERTEBRÆ.

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KATY COLLINS, æt. at 8, fell Sunday, April 15, striking her forehead on the sidewalk. A bruise, disappearing after a few days, was noticed by the mother, but, as nothing alarming followed, she was allowed to go about her play as usual. Six days later the mother noticed that her head was bent forward, and that her chin could not be raised any great distance from the sternum. Supposing it was a "stiff neck," little attention was paid to it; but, becoming alarmed at its persistency, the mother brought the child to me at the South Side Dispensary. Her general health was fair, the only complaint being a tired feeling in the neck, which was relieved by placing both her hands on top of her head and bearing down. Inspection showed a deep furrow between the muscles on either side of the spine, beginning at the level of the upper surface of the fifth cervical vertebra and extending upwards. The head was pushed

directly forward, motions much limited, particularly extension. On tracing the spinous processes upwards a marked break was evident at the level of the upper surface of the fifth cervical, the spinous process of the fourth being fully two-thirds of an inch in advance of the one below it, while a break in the continuity of the transverse processes could be easily felt on each side. With the finger in the pharynx, the projecting vertebra could be readily determined. There was not then, nor had there been at any time, so far as I could learn, any symptoms of involvement of the cord, the child, with the exception of the awkward position of the head, being as well as ever.

This was evidently a case of bilateral dislocation forward of the fourth on the fifth cervical vertebra. Prof. E. Andrews confirmed the diagnosis. Eleven days having elapsed since the accident, with no symptoms calling for interference, I made no effort at replacement.

Prof. Andrews suggested rest in bed with moderate traction, hoping to better the position of the head, but, owing to a misunderstanding with the instrument-maker, this was not carried out. June 13, in company with Dr. J. G. Kiernan, I last saw the case. She is in much the same condition, so far as general health is concerned, but the head is much more erect, owing to an increase in the lumbar curve, no apparent change having taken place at the point of dislocation. We again estimated the amount of displacement to be fully two-thirds of an inch. The manner in which so marked a displacement of the vertebræ could occur, with no symptoms of injury to the cord, has been the subject of considerable speculation on my part, and I am forced to believe that the fall on the forehead first produced fracture, probably of the articular processes, followed by a dislocation as the result of muscular contraction. In favor of this view I would submit the following:

1. In the majority of cases of dislocation of the vertebræ fracture co-exists, some surgeons denying the possibility of dislocation without fracture. However, that a simple dislocation may occur, especially in the cervical region, is highly probable. (See Dr. Williams' case, *British Medical Journal*, April 7, 1883.)

2. From the direction of the force it would be natural to expect that, had dislocation occurred at once, it would have been a dislocation backwards.

3. So awkward and unnatural a position of the head could scarcely have escaped the attention of the mother when examining the bruise on the child's forehead.

4. Examination of the relations of the fourth to the fifth cervical vertebra has convinced me that a dislocation forwards, to the extent which I believe to be present in this case, could not occur abruptly without injury to the cord. On the contrary, if the displacement was gradual, accompanied by a tilting upwards of the spinous process of the upper bone, there would be much more probability of the cord escaping injury. That the cord is capable of accommodation to a certain extent is shown in some cases of Potts' disease with marked curvature.

HISTORICAL AND BIBLIOGRAPHICAL NOTES.

A SERIES OF SKETCHES OF THE LIVES, TIMES AND WORKS OF THE OLD
MASTERS OF ANATOMY AND SURGERY.

By GEORGE JACKSON FISHER, M.D.

XXI. ABÛL-CÂSEM CHALAF EBN-ABBAS AL- ZAHARAVI. COMMONLY CALLED ALBUCASIS.

1060—1122.



ALBUCASIS operated upon tongue-tie in the same manner as it is now done by modern surgeons. He gives particular cautions against opening the artery below the tongue, on account of hæmorrhage. Should the accident occur, he advises the prompt use of the actual cautery

(Ch. ii., 34). In cases of enlarged and indurated tonsils he removes them by incision. The patient is to sit with his head on the operator's bosom, and while an assistant depresses his tongue, the operator seizes the tonsil with a tenaculum, draws it out, and cuts it off with a sharp instrument resembling a forceps, or in other words a pair of scissors. He likewise gives a drawing of another instrument, which consists of a lunated piece of iron fixed in a handle; the primitive form from which the moderns have evolved the tonsil-

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lotome. He relates an interesting case in which he performed this operation (Ch. ii., 36). Guido de Cauliaco copies the description of Albucasis.

Albucasis gives directions for truncating the uvula by incision, and also gives a drawing of an instrument for operating with caustic medicines (Ch. ii., 37).

He directs the removal of fish-bones, and other substances which may be lodged in the pharynx, by the forceps, and in case of failure to introduce an instrument made of lead, of which he gives a drawing, and either to extract the substance or push it downwards. When a morsel of food sticks in the œsophagus, he directs that the person be struck on the back to facilitate its descent. This time-honored proceeding, courteous reader, you observe, has the sanction of eight centuries, and when again you hammer a strangling friend, or are yourself hammered on the back, under like conditions to produce reflex-excito-motor-pharyngo-œsophageal-peristaltic-back-action, please do not forget the old Arab Alsaḥarāvius, vel Albucasis, alias Bulcasim, etc., etc.

Our author copies from Paulus Ægineta his description of the operation of Laryngotomy. He probably never performed it or ever saw it done. He declares that wounds of the windpipe are not extremely dangerous or fatal, and demonstrates it by the narration of the case of a female, who, in attempting suicide, cut her trachea, in which case, by sewing up the wound, he effected a cure without difficulty (Ch. ii., 13).

Albucasis directs the excision of large adenoid tumors, and when there is a large blood vessel at the bottom of the tumor to apply a ligature round its root, and allow it to drop out by putrefaction. In some cases he used the red-hot iron. If the tumor contained fluid, he opened it and dressed the interior with irritating ointments. In other tumors he di-

rects an explorative puncture, in order to ascertain the nature of the contents of its structure. Fatty and other solid tumors are to be cut out by a crucial incision, always being careful to remove the entire capsule. He gives drawings of various instruments, namely, scalpels, tenacula, and perforators, for dissecting out tumors (Ch. ii., 45, 46).

His description of aneurism, and its treatment by ligature above and below, and laying open and evacuating the sac, is much the same as that of Paulus Ægineta. It is remarkably lucid and indicates much skill and good sense.

The cure by compresses and tight bandages is also spoken of (vide Alsaharavius, Pract. xxix., 11).

Mr. Adams, to whom I am so much indebted in preparing this analysis of the surgical procedures of Albucasis (Commentary on the Seven Books of Paulus Ægineta), says, "no author, ancient or modern, has described the modes of performing venesection in all parts of the body more accurately than Albucasis. Bleeding from the jugular vein he describes in much the same way that it is now practiced by veterinary surgeons, namely, by placing a sort of scalpel, bent at the point, which he calls a fossorium, upon the vein, and striking the instrument with a hammer or some such body. He gives drawings of variously-shaped lancets for opening the veins of the arm (Chir. ii., 97).

He gives a minute description of the operation of arteriotomy, and the mode of ligating the vessels, which he advises in cases of inveterate hemicrania, catarrh, etc. (Chirurg. ii., 3).

Albucasis gives a most circumstantial and interesting account of the methods of cupping every part of the body. He particularly recommends cupping the nape of the neck in affections of the brain and eyes. He gives a full account of dry cupping. He advises it to be applied when the disease is seated in places which do not bear cupping with scarifications, such as the regions of the liver, or spleen, the

kidneys, the bowels, and the joints affected with gout. In applying the instrument he directs us either to create a flame in it, or to fill it with hot water. He gives drawings of various instruments for cupping (*Chir. ii.*, 98). He also treats fully of leeching, which, however, he advises only in cases in which the cupping instrument cannot be applied. When the bleeding continues longer than is desired, he directs a piece of cloth soaked in cold water to be applied to the place, or if this fails, styptics, such as galls, beans without their skins, and the like. When the leeches will not take, the place is to be smeared with fresh blood. When it is desired to make them drop off, powdered aloes, salts, or ashes are to be sprinkled on them (*ii.*, 99).

He gives directions for the removal of preternatural and supernumerary digits. When fingers are adherent to one another, he tells us to divide them with a scalpel, and keep them separated by a pledget moistened with oil of roses, or a thin plate of lead between them, until the healing is completed (*Chir. ii.*, 91).

In cases of empyema, cauteries were much used by the ancients. In some cases the hot iron was made to penetrate between the fifth and sixth ribs, into the chest, and thus evacuate the pus at once. Others used the knife for the same purpose. Albucasis gives a drawing of an instrument for perforating the chest expeditiously (*Chir. i.*, 26).

In treating of surgical operations for the removal of cancerous growths, Albucasis says that he never saw a case of cancer cured unless the tumor was small and recently formed. He directs us, when the operation of excision is attempted, to cut out the tumor by the roots, and if the hæmorrhage from any vessels be profuse, to arrest it by the cautery (*Chir. ii.*, 53).

In cases of abscess of the liver, Albucasis directs the pus to be evacuated with the red-hot iron, and gives a drawing of a spear-shaped cautery for this purpose (*ii.*, 30).

Albucasis speaks of paracentesis in cases of hydrocephalus internus in infancy, but adds that in every case it had proved fatal. He cautions against wounding the artery lest instant death should occur.

Paracentesis was resorted to by most of the ancients in cases of abdominal dropsy. The description of the operation, the instruments, and the place of incision as given by Albucasis is very minute. After the incision he tells us to introduce a canula made of silver, copper, or brass, having a small hole at the bottom and three at the sides. He advises the evacuation of not more than one-half of the fluid at first, the remainder subsequently, according to the strength of the patient. He says the opening readily contracts when the canula is removed (ii., 54).

In cases of abdominal wounds, and wounds of the intestine, Albucasis gives several modes of performing gastrography, and relates the history of a case in which he treated the wound by this operation (ii., 87).

Albucasis quotes quite literally from Paulus Ægineta, all that relates to hypospadias, to imperforate glans penis, phimosis, and adhesion of prepuce to the glans. He describes the operation of circumcision on boys as a rite of the Jewish religion. He directs the prepuce to be cut with a pair of scissors, and the part to be allowed to bleed freely. From the manner in which he expresses himself respecting the operation, there can be no doubt that Albucasis was a Jew, and Paulus Ægineta a Pagan (ii., 57).

Catheterism, and injection of the bladder, were well-recognized operations in Arabian surgery in mediæval times. Albucasis borrows his account chiefly from Paulus. The catheter recommended by Albucasis was made of silver. He gives a description and drawing of an instrument for throwing injections of oil and water into the bladder when inflamed or ulcerated. It is a tube of silver or copper having the bladder of a ram attached to it (Chir. ii., 59).

The operation of lithotomy, and all that relates to vesical calculi is carefully and well described by Albucasis. It cannot fail to be interesting to the modern surgeon to read the following account given by this ancient surgeon of this very important operation.

Having cleared out the bowels with a clyster, the patient is to be shaken so as to make the stone descend, and he is then to be secured in the arms of an assistant, with his hands under his nates. The surgeon is then to press upon the perineum, and, if the stone be felt, the operation is to be proceeded with; but otherwise, the index finger of the left hand, if the patient be a child, and the middle if an adult, is to be introduced into the anus, and the stone is thereby to be gradually brought down to the neck of the bladder. Having pushed it outwards to the place where you mean to make your incision, an assistant is to be directed to press down the bladder from above the pubes, while another draws up the testicles with the one hand, and with the other stretches the skin under them. Then with a proper scalpel the operator is to make an incision between the anus and the testicles, not in the middle, but towards the left nates, straight upon the stone which is to be pressed out by the finger. Let the incision be transverse (oblique?), large externally, but internally the size of the stone. If the stone does not then start out, the operator must seize upon it with a forceps, or a hook having a lunated extremity. If there be more than one stone, the largest must be extracted first, and then the others may be easily removed. When the stone is large he directs us to break it down with a forceps. His directions respecting the after treatment are similar to those of Paulus. When a calculus sticks in the urethra, he tells us to cut down upon it. His description of lithotomy in the female is more minute and particular than that of any previous writer. Having pro-

cured a dextrous midwife, or some proper person to introduce her finger into the rectum or vagina, and press the stone down to the left hip, the operator is to make first a small incision over it, and afterwards, by the help of a sound or specillum, it is to be enlarged so as to allow a passage for the stone (*Chirurg. ii.*, 60, 61).

All that is said above is little more than a repetition of what Celsus wrote on this subject in the first century. The ancient operation with scarcely any alterations will be found described in the works of nearly all of the earlier modern writers on surgery. See, Brunus (*Chirurg. Magna*, ii., 17), and Guido de Cauliaco (*Chir. vi.*, 2). Brunus, however, preferred the strictly median incision.

In hydrocele, the treatment adopted by Albucasis consisted in making an incision in the swelling and dissecting out the tunica vaginalis of the testicles. The chief dressing was to fill the interior with wool soaked in oil; and applying externally wool dipped in warm oil and wine. In some cases the actual cautery was used instead of cutting out the tunica vaginalis. He adds, that if the patient be timid and do not choose to submit to these operations, the surgeon may let out the water either with a scalpel or the instrument used for tapping in dropsy. He states, however, that after this operation the water will collect again (*Chirurg. ii.*, 62).

In castration, on account of tumor, or other morbid growth of the testicle, Albucasis directs us to separate the cremaster muscle from the blood vessels, to tie the vessels, and then remove the testicle from the surrounding parts. When the disease consists of a fleshy tumor which adheres to the testicle he directs us to cut it out, and save the organ. After the operation, the wound is to be filled with rose-oil and wine (*Chir. ii.*, 63).

In ancient times the radical cure of hernia was not only

a serious but a most cruel operation. In strangulated hernia no operation was undertaken. In the operation for the radical cure of hernia, the testicle was always sacrificed, the vessels were ligated, a portion of the peritoneum removed, and antiseptic or air-excluding dressings of wool and rose-oil applied. This operation which was described by Paulus Ægineta, in the seventh century, was done much in the same manner by Albucasis, and continued to be practiced until within about two centuries of the present time. The operation, hazardous as it may appear to us, could not have been attended with great danger, otherwise it would not have been so frequently performed as it seems to have been, for, according to Fabricius ab Aquapendente, a celebrated specialist, known as a rupture doctor, of his time informed him that he used to operate upon two hundred patients at an average every year. Fabricius, however, disapproved of this operation, and would have it resorted to only in extreme cases, and to be content in general with supporting the parts with a truss.

Albucasis gives the following account of the operation: He says the disease is occasioned by the descent of a portion of intestine to the testicle, owing to rupture or distention of the peritoneum. Sometimes, he says, fæces get into the prolapsed bowels, and being retained give rise to violent and sometimes fatal symptoms. When going to operate he directs us, in the first place, to make the patient reduce the intestine if reducible. Then an incision is to be made along the whole skin of the testicle, and hooks are to be fixed in the lips of the wound so as to enlarge it and allow a passage for the testicle. The membranes, then, below the skin, are to be dissected, so as to expose completely the tunica vaginalis (*sifac album*). The index-finger is then to be introduced between the tunica vaginalis and the second coat (tunica albuginea?) so as to free the adhesions at the back

part of the testicle. The operator is afterwards to separate the testicle from all its adhesions and raise it up to the external wound. He must now examine whether any portion of intestine remains protruded, and if so it must be replaced. The operator is then to take a large needle armed with a cord of ten threads, and having introduced it behind the tunic under the skin of the testicle its extremities are to be cut, and the threads arranged into four pieces. With them the peritoneum is to be tightly bound in a crucial form, so that the nutrient vessels may not be able to reach it, which will obviate inflammation. Another ligature is to be applied afterwards at the distance of less than two fingers' breadth from the former. After applying these two ligatures, about a finger's breadth of the peritoneum is to be left, and the rest is then to be cut all around, and the testicle removed along with it. An incision is then to be made at the lower part so as to allow an outlet for the blood and matter. Wool dipped in oil is to be applied afterwards, and bound as formerly described. Sometimes, he adds, the cautery is applied to the tunica vaginalis after the incision for fear of hæmorrhage (*Chir. ii.*, 65). He minutely describes the treatment by burning in another place (*i.*, 47).

[To be Continued.]

NEW YORK SURGICAL SOCIETY.

EXCISION OF THE HIP-JOINT.¹

A PAPER on this subject was read by Dr. Charles T. Poore, for which see pages 66-71.

In the discussion that followed, Dr. Sands said that he thought the rule followed by Dr. Poore of postponing the operation of excision until the disease has reached a chronic stage was better than the opposite rule of early interference. As already remarked by Dr. Poore, the cases which are seen in hospital practice are usually of an aggravated character, and, as a rule, have already been subjected to the rest treatment, and treatment by extension without avail before they are admitted. He supposed, however, that all would agree that until these milder methods had been found to be unavailing excision should be withheld, for it is a fact that in private practice where ample means are at our command a very large number of patients with hip-joint disease recover, either with entire restoration of the function of the joint in a few cases, or with ankylosis in other cases, thus obviating the risks attending excision of the bone. But, as Dr. Poore had remarked, when abscesses have formed and sinuses exist, and there is every indication that nature can do no more, and when by postponing an operation, the general health of the patient becomes more impaired, and secondary changes, in the liver and kidneys especially, become probable, excision seems to be the only expedient to which surgeons can resort. It did not seem to him that the indications in hip-joint disease were different from those of disease in other joints in which there is no question with regard to the propriety of surgical interference. His experience corroborated Dr. Poore's in this particular, that usually there is very decided amelioration of symptoms after performance of excision, and it would seem that this is more certain to occur now than formerly, when we paid less

¹ Stated Meeting, March 13, 1883.

attention, especially to drainage, and had not the advantage of antiseptic surgical dressings. He had operated twice within the last six weeks for excision of the hip-joint. Both patients were children: one a girl six years of age, the other a boy nine years of age. Both had been under observation for one year, and had well marked disease with abscess when they entered the hospital. In both the operation was postponed in the hope that the abscesses would disappear, but the general health of the children began to give way, and it was very plain that the disease would proceed to an unfavorable termination if left to pursue its natural course. In both cases the acetabulum had been perforated, and the extent of destruction reached nearly as far as the level of the trochanter minor. In both cases the femur at the point of section showed signs of osteitis, and in both the improvement after operation was very marked, although in one more so than in the other. The boy whose appetite had already entirely failed, and whose pulse was very rapid, improved so much, immediately after the operation, that he was able to eat, while his pulse was very much diminished in frequency. In the girl the shock of the operation proved severe for a few days, but after that her general health began to improve, and the improvement had continued. He thought that surgeons should not abstain from the operation because a radical cure is not very likely to take place. It seemed to him that the palliation afforded by the operation was sufficient to justify its performance. Respecting complications in bad cases, such as degeneration of the liver and kidneys, while it is a general fact that such complications are fatal, it occasionally occurs that the enlargement of the liver, either diminishes or disappears. He could recall one case, that of a lad twelve years of age, upon whom he operated in 1870, and in whom a very bad state of affairs existed at the time of the operation. There was extensive abscess and sinuses, and there was disease of the head of the bone and of the acetabulum—the latter, however, not perforated—and the general condition was such as to give but little expectation of a good result. But the wound healed, and although afterwards it reopened, no dead bone could be found. Finally permanent closure took place about one year after the operation. Soon afterward the urine became albuminous, and two years later there was a very decided tumor in the abdomen, evidently

formed by an enlarged liver. The boy has remained anæmic ever since the operation was performed, and although albumen still continues to be present in moderate quantities in the urine, the enlargement of the liver has disappeared, and the lad has grown to be a man, is now fairly well, and able to walk without any assistance, except that derived from a thick soled shoe. This boy's parents are living, and are in excellent health. There is no hereditary tendency to tubercular disease.

Dr. J. C. Hutchison remarked that a few years ago there was a great disposition to excision of the head of the bone in cases where it would seem that the patients would recover without it. The tendency, however, had turned in the opposite direction, and probably many cases which should be operated upon were neglected until it was too late. It seemed to him that where the disease had resisted all the usual treatment, such as rest, extension, etc., and abscesses had formed, and the patient is gradually growing worse, and especially where there were some evidences of amyloid degeneration, that the operation is clearly indicated. He had seen a great many cases recover under the most adverse circumstances with ankylosis of course, and sometimes the deformity was such as might subsequently be remedied by an operation.

Dr. Briddon had seen a number of cases like those reported by the author of the paper, and he thought that the majority of those in which perforation of the acetabulum had occurred terminated fatally. Cavities resulting from accumulations of pus within the cavity of the pelvis were difficult to drain. He had one specimen in which the perforation was large enough to have allowed the passage of the head of the femur, but it was not displaced in that direction. The most favorable result he had seen was in a case of a child eleven months old. The excision was made in the Presbyterian Hospital. One year after, the shortening was a little over a quarter of an inch. All the movements of the joint were free. The sinuses were closed, and the patient is now in robust health, and an inmate of the institution of St. John's Land. In all the cases that he had seen the patients were the children of tubercular parents. In one case of long standing, in which the patient had recovered from the effects of the active process of the disease, he had judged that the caries had ceased, and that the numerous sinuses which refused to heal

were kept open by the presence of a sequestrum. An explorative operation was made, the head and neck were gone, the acetabulum was filled with bony growth, in the centre of which was an imprisoned mass of necrosed bone. In that case the sinus persisted for a long time after the removal of the offending cause. He had recently seen a young woman who was in the Presbyterian Hospital four or five years ago. All her sinuses had closed, and at times she could get about with tolerable comfort, but for a large portion of the time she was confined to her bed by pain. She had for some time suffered from diarrhœa, and he thought it possible that these discharges might indicate that the external sinuses had closed because the pus had sought an outlet through the acetabulum and rectum, but an investigation in that direction did not sustain the suspicion. Would not the symptoms in this case warrant an explorative operation ?

The President, Dr. Markoe, remarked that in deciding the question as to whether, in any given case, excision should be performed, he believed a much safer conclusion would be reached if the possibilities in these cases were always borne in mind. There is no case which is absolutely hopeless. Even cases in which perforation of the acetabulum has occurred and intra-pelvic abscesses exist are not certainly and absolutely hopeless. In making up his estimate with reference to the result in any given case, he had been influenced in his judgment by one striking instance. He had seen a young girl who had suffered for a long time with numerous abscesses connected with disease of the hip-joint. The operation of excision seemed to be entirely indicated, and was recommended, but refused, and recovery finally resulted. During the progress of the case abscesses formed in the pelvis and discharged fæcal contents, showing that there was communication with the intestine. The patient finally was able to walk upon the ankylosed limb ; and many years afterward he saw her, and she had become a fleshy, healthy girl, with an appearance of the tissues about the hip-joint, which was somewhat remarkable. In her thin, emaciated condition the soft parts, during the healing process, had become united to the bone opposite each fistula, and the interspace between being gradually filled up with fat, left about the hip six or eight depressions nearly as deep as the length of his finger at points corresponding to those at which the old sinuses opened.

EDITORIAL DEPARTMENT.

KÜMMELL'S MERCURIC BI-CHLORIDE ANTISEPTIC METHOD.¹

Corrosive sublimate, or, according to the more modern nomenclature, mercuric bi-chloride, is among the oldest antiseptic preparations whose superior anti-putrefactive properties were well known. But there seems to have been no disposition among surgeons to put it to practical use in the treatment of wounds, probably through fear of its well known toxic effects. Nor need one wonder at this when the maximum dose of the drug is taken into consideration, and the certainty with which alarming symptoms of poisoning are produced when this dose is exceeded. The first clinic in which the use of it was ventured in any shape was that of Von Bergman, of Würzburg, where a gauze prepared with it was used instead of a carbolized gauze.

The credit of using it as a general antiseptic, both for purposes of irrigation and wound dressing, belongs to Kümmell, of Hamburg, who, having his attention called to its powerful germicide properties by the labors of Koch, proceeded by a series of experiments to demonstrate in how far it might be made useful to the operating surgeon. Dougall, Billroth, Buchholz and Sternberg, of the United States Army, found that in solutions varying in strength from 1 to 1,000 to 1 to 20,000 bacteria were killed and their further development checked. The bacillus of gangrene of the spleen, according to Koch and Pasteur, resists the action of all other antiseptics with the exception of that of the mercuric bi-chloride. In a solution of this latter of the strength of 1 to 1,000, Koch succeeded in destroying them entirely within a few minutes; in a solution of the strength of 1 to 5,000 their growth was markedly retarded.

Acting upon the possibilities which these experiments suggested, Kümmell proceeded to make a practical test of the applicability of the mercuric bi-chloride as an antiseptic wound

¹ *Archiv für klinische Chirurgie. Band xxviii., Heft 3, pp. 673-719.*

dressings. Disappointed at the comparatively slight antiseptic effect of the five per cent. carbolic solution in general use for purposes of irrigation, he at first used a 1 to 5,000 solution of mercuric bi-chloride for the same purpose in Schede's wards in the Hamburg General Hospital. He gradually increased the strength of the irrigating fluid to 1 to 1,000, and even to a one per cent. solution, without the slightest trace of dangerous symptoms supervening. The five per cent. solution of carbolic acid was used for the spray and as a bath for the instruments. The latter, if exposed to the action of the mercuric bi-chloride for only a few seconds, will become blackened by the rapid amalgamation upon their bright surfaces; nickle plating will not protect them from this injury. Enveloped as the head of the operator and his assistants are by the spray, a sufficient amount of the latter, were it to be even an atomization of a very dilute solution of the mercuric bi-chloride, might be productive of troublesome if not positively dangerous symptoms. It is evident, therefore, that for neither of the above purposes can the corrosive sublimate solutions be made available. In two patients treated with the one per cent. solution the constitutional effects of the drug appeared; in one salivation taking place, and in the other a diarrhœa, which latter was afterwards thought to be of a tuberculous origin. Recovery took place in both cases in a few days without the necessity of a removal of the dressings. Both of these patients had suffered previously from iodoform intoxication, suggesting a peculiar susceptibility to the action of antiseptics.

Since the introduction of the mercuric bi-chloride solution as an irrigating fluid, Kümmell deprecates the use of sponges, except when absolutely required in the operation itself; the cheapness of the sublimate justifies its free use in cleansing the parts. The floor and the walls of the operating room are scoured and scrubbed with the solution, and no accident has yet occurred to either attendants or patients. After seven months' use of the substance in this free manner, he avers that, with the exception of the two cases above alluded to, no ill effects whatever have been attributed to it.

In a person with an extremely sensitive skin the dressings of mercuric bi-chloride may, according to Kümmell, produce an eczematous condition of the parts surrounding the wound. This does not occur from a simple irrigation of the wound

and the surrounding tissues ; but when it does take place, which is rare, it arises from the constant contact of the wound and its neighborhood with dressings impregnated with the sublimate. In wounds in which putrefaction changes have already occurred, the mercuric bi-chloride solution quickly banishes the odor and arrests the septic processes.

The dressings devised by Kümmell consist of sublimated gauze and cotton, sublimated silk, sublimated cat-gut, sublimated oil, and sublimated inorganic dressing materials. These latter comprise powdered glass, sand, coal ashes, asbestos, lint made from spun glass, and, for purposes of drainage, capillary threads of spun glass.

Sublimated gauze and cotton are designed to take the place of carbolized gauze and cotton. They are made hygroscopic in the usual manner, and then impregnated with the following :

Corrosive Sublimate...	10 parts.
Alcohol...	4,490 "
Glycerine.....	500 "

The moisture is pressed out with a clothes wringer. If a stronger solution of the corrosive sublimate is used, eczema and bullæ of the integument will be produced.

For sutures, sublimated silk is used. It is previously prepared as for carbolized silk, by Hegar's method, and then boiled for two hours in a one per cent. solution of the corrosive sublimate ; it is then transferred to a one-tenth of one per cent. solution of the same where it is kept ready for use.

For ligatures sublimated cat-gut is used. The unprepared cat-gut is first immersed in a one per cent. solution of the corrosive sublimate for twelve hours, and then firmly wound upon spools, and preserved in an alcoholic solution of half of the above strength, to which is added ten per cent. of glycerine. Cat-gut thus prepared is very flexible, and it is asserted by Kümmell will give perfect immunity against infection, whatever might have been the condition of the gut prior to its preparation.

Sublimated oil, of the strength of one per cent. is employed for uniformity's sake. This oil however, as shown by Wolfhügel and Knorre, of the Imperial German department of health, possesses no more powerful antiseptic properties than carbolized oil.

In order to avail himself of the powerful antiseptic pro-

perties of the mercuric bi-chloride in the form of a powder dressing, it became necessary to select some suitable vehicle, with which to mingle it in proper proportions. For this purpose it was deemed needful to select some material which of itself was aseptic, and which, by the addition of the corrosive sublimate, could be rendered antiseptic. As further desirable properties of this material, it should be perfectly absorbent, prepared without difficulty, and be within the reach of all. Rosenberger has shown that a temperature of 140° (C.) does not destroy the life of certain pathogenic micro-organisms, and that when blood containing these organisms was heated above this limit, and then vaccinated, the vaccination was successful. It therefore was evident that either a much higher temperature than the above must be reached, in order to attain perfect asepsis, or else recourse must be had to the most powerful destroyers of animal life—namely, the mineral acids. Substances which could withstand the action of either this high temperature, or that of the mineral acids, could only be of the inorganic class. The first material hit upon to fulfill these indications, was glass crushed to a fine soft powder, after which it was well washed with concentrated sulphuric acid, and mixed with the corrosive sublimate. It was found, however, that common sand possessed all the needful properties, was easier to obtain, could be made aseptic more rapidly and conveniently, and besides was incomparably cheaper. Kummell now uses it exclusively as a constituent of his antiseptic powder dressing. Common white sand is first well sifted, and then heated in a covered vessel over a coal fire; upon cooling it, is mixed with an ethereal solution of the mercuric bi-chloride, and kept for use in glass-stoppered bottles. To make this solution, 10 grm. of the mercuric bi-chloride is dissolved in 100 grm. of ether; this quantity is amply sufficient to perfectly impregnate 10 kilo. of previously heated sand. If the ethereal solution, as thus prepared is thoroughly mingled with the sand, small crystals of the mercuric bi-chloride can be discerned under the microscope clinging to the grains of sand.

The sublimated sand can be used in many ways as a wound dressing. It may be used as any other powder dressing in filling in previously disinfected and bloodless wound cavities where primary union cannot be hoped for. In such a case

the dressing should not be covered with an impermeable covering, such as parchment paper, gutta-percha tissue or Mackintosh, for the reason that it is desirable not to prevent drying of the secretions in the sand, healing taking place as under the scab. The under dressing is not to be disturbed for several weeks, or until healing has taken place. The outer dressing of sublimated gauze is removed from time to time as the secretions find their way through and dry thereon, and new pieces are applied in their stead. When irrigation of the parts is required, the solution of mercuric bi-chloride is used, and new sand applied where the old has been washed away. Wounds thus treated were always found to be aseptic and odorless. The outer pieces of gauze in which the secretions had collected were, however, sometimes found to possess a glue-like odor.

The sublimated sand tends to keep the wound dry by absorbing whatever secretions occur, and likewise by decreasing their amount. The discharge is often very limited indeed; large cavities, such as are left after excision of a joint, being filled with the sublimated sand, are kept so for a week without the appearance of a single drop of pus. The rapidly forming granulations push the sand outwards from the bottom of the cavity, and, upon being finally removed, disclose the wound firmly cicatrized as under the scab. No fear need be entertained of the sand being imprisoned in the granulations and remaining in the healed wound; should this occur, which is very rare, the particles of sand in the tissues will be found to be perfectly harmless. A great advantage of the sublimated sand dressing will be found in its applicability to compound fractures and other injuries requiring the use of a plaster of Paris dressing. Here, on account of the scantiness of the discharge under this dressing, the fixed apparatus may be left in situ for several weeks without being disturbed.

By means of an insufflator the fine sublimated sand may be instilled into sinuses, various fissures and deep recesses.

The sublimated sand will be found equally convenient of application in the case of wounds in which primary union is expected to occur. After the wound is brought together and drainage threads of spun glass placed in position, a layer of lint, made of spun glass and disinfected in the solution of the strength of 1 to 1,000, is to be laid along the line of incision to prevent the sand from coming in contact with and between

the edges of the wound. The sand may now be placed on in sufficient quantities and covered by several layers of sublimated gauze. This method is susceptible of general application to amputation and resection wounds, when very firm compression is not needful, and where the bone underlying the tissues affords a firm support.

A rise of temperature occurring within the first three days, the so-called aseptic fever of Lister, and which is of common occurrence when other antiseptics are used, was entirely absent when the above form of dressing was employed, according to its originator.

Kümmell gives some remarkable experiences with Pirogoff's amputation, in which the mercuric bi-chloride treatment of the wound was carried out. In four cases of the above operation, healing took place without reaction of any kind, bony consolidation and absolutely dry linear cicatrices being present in from ten to fourteen days. He also cites his observation of abscesses which, after opening and scraping the interior and disinfecting the same, the edges were stitched or not, as the case might be, and then dressed with the sublimated sand. Even here, healing by first intention without further suppuration, was the almost invariable result. In a like manner, suppurating joint cavities were freely opened, their interiors thoroughly scraped with the curette, spun glass threads used for purposes of drainage, and a dense layer of sublimated sand applied as a dressing. The drains were removed in a few days, the openings left by them covered by a new supply of sand, and, in an average of eight days, perfect healing was found to have taken place. Old fistulous openings and sinuses, which had resisted the iodoform treatment, after being vigorously scraped with the curette, were disinfected and treated by the application of spun glass threads covered with the sublimated sand. These were removed in about nine days, the wound being then covered with the sand dressing, healed without fistulous opening.

Owing to the fact that the powdered glass and sand dressing is not applicable, in the above described manner, to all wounds, and in the case of wounds in which union by first intention is expected to occur its application might lead to fears of failure because of the presence of the sand along the line of incision, cushions of different sizes and shapes filled with the sublimate sand have been introduced. The fabric

employed for the cushions is the coarsest textured cotton cloth, well disinfected and rendered hygroscopic. Thus prepared, these cushions absorb discharges with the greatest facility. In order to insure their pliability and ready conformation to the parts the sand should not be packed tightly in the little bags of cotton cloth, but rather loosely, so as to allow room for the sand to change its position when necessary. They should be left in position, unless some positive indication exists for their removal, until either the wound is healed or the drainage threads or tubes are removed.

Kümmell's own criticism upon the cushion dressing is that it is heavy and cumbersome, and may easily produce abrasions and blisters. These objections will probably stand in the way of their general use. It became necessary therefore to seek some lighter inorganic substance possessing absorbent properties, and capable of being rendered antiseptic by the addition of the mercuric bi-chloride. Finely sifted coal ashes was found to answer this purpose. This substance in its chemical composition consists of antiseptic elements to a greater or less extent, and is free from organic substances. It is still further disinfected by being wetted with a 1 to 2,000 solution of mercuric bi-chloride. The best ashes for the purpose consist of the fine and light powder, called flying ashes, which settles in large quantities behind the fire boxes of steam boilers. Cushions filled with this latter substance form admirable means of compression, being soft and pliable and readily adapting themselves to the shape of the parts to which they are applied. The ashes can be obtained in almost unlimited quantities, has considerable power of absorption, and, as before stated, in itself contains elements favorable to antiseptis.¹ Unhealthy ulcers treated by simply covering their surfaces with unprepared ashes in a few days, according to the experience of Kümmell, show a clean surface favorable for trans-

¹ Kümmell gives the following as the average composition of the ash of English coal :

Sulphuric Acid.....	8.38
Phosphoric Acid.....	1.18
Silicic Acid.....	61.66
Lime.....	2.62
Magnesia	1.63
Oxide of Iron and Alumina.....	24.42

plantation or skin-grafting, and redness and inflammation in the integument surrounding the ulcer will quickly disappear. The cushions filled with the prepared ashes for ordinary purposes of wound dressing, are moistened just prior to being used, in order to facilitate their absorbent action. It is recommended to use several small cushions rather than one large one in the dressing.

Aiming to produce a dressing that shall be entirely inorganic in its nature, Kümmell suggests having the bags for the cushion dressings made of woven asbestos. The cushions in that case could be used several times by simply washing, and afterwards subjecting them to a very high temperature, or to the action of the mineral acids. The high price of asbestos, however, will preclude its extensive use at present.

Another feature of Kümmell's antiseptic method consists in the employment of glass wool or wadding. This material is derived from annealed glass rods, which are capable, when heated, of being drawn into long delicate fibres having a diameter of from 0.01 mm. to 0.006 mm. They have a snowy white appearance, with a silk-like luster, and are very flexible. They can be braided together into bunches, or compressed into masses for convenience of use. Bunches of these can be tied together, and make most efficient capillary drains. The strands are so soft that there is no danger of broken particles entering the tissues. This glass wool can be thoroughly purified by chemical agents, and after washing, can be rendered antiseptic by immersing it in the ethereal solution of mercuric bi-chloride acid used in the preparation of the sublimated sand. A dry dressing thus prepared, will absorb secretions very rapidly. A much simpler and more effectually antiseptic dressing of this material consists of masses of it, disinfected by submersion in concentrated sulphuric acid, and preserved in a one per cent. solution of the mercuric bi-chloride; when needed this is squeezed out of the solution and applied moist in thin layers directly to the wound. Where the sand or ash cushions are used, a thin layer of this glass wool will serve as a protection to the wound without detracting from the absorbent powers of the rest of the dressing.

GEORGE R. FOWLER.

ALLEN ON THE ARTERIES, VEINS AND LYMPHATICS.¹

This fasciculus is markedly superior to the two preceding ones. If the sections on the bones, joints, muscles and fasciæ had been as truly excellent as this fourth fasciculus, any candid reviewer would have confessed that the author had as nearly reached his self-imposed standard as it was possible for any one man to do. It, however, contains errors and omissions which impair its usefulness; yet there is an enormous amount of research evidenced by the accumulation of rare and interesting facts not to be found in any other one book, and for which both student and practitioner ought to be duly grateful. In his general consideration of the subject, the author points out that "variations" in the blood vessels are due in general terms to "irregular development of the parts in which the variation occurs;" to "imperfect absorption of fœtal or other temporary structures;" "habit and age," and "defects in curvature of the vertebral column and the respiratory movements." Dr. Allen thinks that the course of many arteries is "predetermined by nerve trunks," but gives no arguments in support of this view beyond the facts that "even the recurrent arteries about the joints are apt to follow the track of a nerve in their ascent." "In most instances where an artery and a vein are superimposed, the vein is the more superficial of the two. Hence veins are apt to be compressed by aneurismal tumors" the author thinks. The author makes some interesting observations on the varieties and causes of hæmorrhage, but space is wanting for anything further than this reference. An elaborate and highly interesting account is given of the heart. We would refer our readers to the section relating to the causes of malformations of this organ, which contains information of great value, both to the pathologist and general practitioner. We shall quote only one point, showing how suggestive is the author's text in explanation of malformations.

Dr. Allen states that even in the normal adult heart a small portion of the basal part of the interventricular septum consists merely of endocardium and fibrous tissue. This accounts for the occasional perforation of this part by dis-

¹ A System of Human Anatomy, including its Medical and Surgical Relations. By Harrison Allen, M.D., Professor of Physiology in the University of Penn., etc., etc. See IV. Arteries, Veins and Lymphatics. Phila., Henry C. Lea's Son & Co., 1883.

ease, or the formation of a diverticulum in this position directed towards the left ventricle.

The description of the semilunar aortic and pulmonary valves is very deficient, and fails therefore to convey a correct idea of their method of closure. Variations and the causes of malformations of the aorta are clearly and concisely given.

The author insists upon the incorrectness of the ordinarily received view of the free intercommunication of the coronary arteries. We must again most emphatically deny that "the anterior tubercles on the transverse processes of the cervical vertebræ are guides to the position of the" carotid. That of the *sixth* is, but no *other*. "The extraordinary independence of the nutrition of the two halves of the tongue is in part explained by the fact that the right and left lingual arteries have fewer anastomoses than most other arteries." Dr. Allen shows that "the capacity of the basilar artery is less than the sum of both vertebrals," and thus explains the tendency to aneurism observed in that vessel from the undue strain to which it is subjected.

In describing the collateral circulations, the author has adopted a most commendable method. Thus, when speaking of the right subclavian he gives the following formula :

$$\begin{array}{l} \text{Thyroid axis } \left(\begin{array}{c} \text{Transversalis Colli} \\ \text{Supra-scapular} \end{array} \right) + \text{Scapular.} \\ \text{or} \\ \text{Thyroid axis } \left(\begin{array}{c} \text{Transversalis Colli} \\ \text{Supra-scapular.} \end{array} \right) + \begin{array}{c} \text{Subscapular} \\ \text{Intercostal.} \end{array} \end{array}$$

This gives at a glance that which in other works requires careful perusal of the text. Attention is called to the important fact that the third part of the subclavian artery may pursue nearly a vertical course, and be placed so high in the neck that the ordinary procedures for its ligation may fail to expose the vessel. Two operators failed on this account, one when attempting to secure the vessel on a cadaver, and the other in a hospital case. A considerable number of dissections go to prove that this disposition of the vessel is far more common than is usually taught. The artery may also run "in front of the scalenus," and it may even pierce it. The phrenic nerve has also been found passing "across the third part of the subclavian artery." The fact that "no matter to what size the" * * * bronchocele "may attain the vessels always preserve the usual relation to the under surface

and basal borders of the thyroid body," is of cardinal importance with reference to the removal of such growths. The transversalis colli artery, contrary to the statement of most anatomists, has been shown to arise from the third part of the subclavian artery in a considerable number of dissections. The important bearing of this fact upon the successful ligation of this third part of the subclavian artery needs no comment.

Dr. Allen emphasizes an interesting fact with reference to femoral hernia thus: The obturator artery arises from the epigastric artery more commonly in the female than the male, and as the femoral variety of hernia is, above all others, most common in females, the preponderating chance of meeting with this abnormality should always be borne in mind when operating on a woman.

We notice that the author states almost without qualification that the profunda femoris arises about one and a half to two inches below Poupart's ligament, a fact which would encourage the deligation of the vessel at this point. After many years' observation of numerous dissections, we have come to the conclusion that the common femoral in a considerable number of cases is a very short vessel, in some cases ceasing just below Poupart's ligament, in others within less than an inch, and so on to two or more inches. Rich. Quain even relates a case where the profunda came off *above* Poupart's ligament. A single sentence under the head of variations states that the vessel may arise near Poupart's ligament, but it is liable to be overlooked, and leaves the impression that it is very uncommon.

We regret to withhold our commendation from the rules given for ligation of the vessels. In some places they are given much too vaguely, and in one place we are told to make a cut parallel to the tibia and a little to its *outer* side to reach the posterior tibial artery. This would certainly render explicable the implied recommendation of Guthrie's method of reaching the vessel, which, difficult and bloody as it is, is *possible*, while the other would be *impossible*!! This is mere carelessness; but from what we know of some students, etc., such errors are none the less capable of leading astray.

Several interesting pages are devoted to the development of the greater veins, accompanied by three diagrams, which render this rather abstruse matter perfectly clear. The

author shows that the veins which are early formed and not subject to normal intra-uterine change present comparatively few variations, while those dependent upon the differing rates of development of organs or parts of organs are subject to numerous variations. Verneuil's curious observations on venæ comites are given, for details of which the reader must consult page 415.

By the fact that "much of the superficial blood of the upper part and side of the face passes *inward* to the brain-case," Dr. Allen explains the tendency of facial phlebitis to extend to the brain sinuses "except when the exciting cause lies at a point in or about the lower lip, in which case, as a rule, the inflammation extends downwards," because the blood-current here pursues a similar course.

Nine pages are devoted to the consideration of the lymphatic system. The only criticism that we would offer is as to the absence of a proper re-description of the anatomy of the lymph-gland itself. We note nothing new of special interest in this section.

The remaining six pages are devoted to a description of the ductless glands. These "include the pituitary, the thyroid, the intercarotic, the thymus and the coccygeal bodies; the adenoid structures of the alimentary canal; the spleen, and the supra-renal capsules." The author gives certain embryological reasons for classifying them after a certain manner, but does not make it clear whether he approves of this plan. He considers that the notches at the borders of the spleen with the limitation of the capillary network of each division of the splenic artery warrant the assumption that this organ is "composed of numbers of united spleniculi." We think the suggestion not only ingenious, but highly probable. In describing the supra-renal capsule the author shows that it is not supported by the kidney, but by its own blood-vessels and nerves, so that in renal dislocation the supra-renal body remains *in situ*.

Dr. Allen maintains that any account which describes the presence of a central cavity in the supra-renal capsule is erroneous, and is due to post-mortem softening of a previously solid medullary portion.

C. B. NANCREDE.

THE QUESTION OF TREPHINING IN INJURIES OF THE HEAD.¹

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THE operation of trephining the skull having been performed in my service at the Roosevelt Hospital in seven cases during the past year, I have thought that a brief account of these cases might be profitable, by eliciting from the members of our society their experience in the operation, and more especially their views in regard to the indications for its performance. For ages past, no surgical procedure has been the subject of keener controversy ; and the diversity of opinion which still prevails concerning it suffices to prove that the question of its value is yet unsettled, and that it is one of inherent difficulty and obscurity. Further discussion, therefore, appears to be desirable ; particularly when we consider the fact that a few American surgeons have lately endeavored to extend the sphere of the operation by reviving the obsolete practice of trephining in cases of simple fracture attended with displacement or depression, even in the absence of head symptoms, and merely as a preventive measure.

Before proceeding to relate briefly the cases above referred to, it may be proper to state that I shall employ the

¹ Read before the New York Surgical Society, March 27, 1883.

term trephining in its wider sense, which includes under this designation the several methods by which fragments of bone are elevated or removed, whether by means of a trephine, Hey's saw, chisel, elevator, or gouge-forceps.

Out of the seven cases, the operation was performed once for simple fracture with depression, four times for compound fracture with depression, and twice for epileptic and paralytic affections following an injury.

CASE I.—On August 23, 1882, a boy, aged thirteen, was brought to the hospital in a semi-comatose state, caused by a fall from a horse just before his admission. On examination, a scalp wound was found over the left, and a hæmatoma over the right parietal bone, but no fracture was discovered. The left side of the body was partially paralyzed.

Treatment.—Iodoform dressing to scalp wound; ice-cap to head.

August 25th.—Patient still comatose. Dr. Halsted, the assistant surgeon, suspecting fracture, made a crucial incision over the right parietal bone, and discovered an extensive depressed fracture of the right temporal and of both parietal bones, running upward beyond the vertex. A large piece of the temporal, and several fragments of the parietal bone were elevated or removed, and, on following up the line of fracture to the vertex, a rent was found in the dura, through which a considerable amount of brain substance had escaped. During the operation, the superior longitudinal sinus was wounded. Bleeding was arrested by pressure, and the external wound was partially closed by suture. Consciousness did not return, and death occurred two hours after the operation.

Evidently, in this case, the operation was useless; and, undoubtedly, it would not have been undertaken if the

extent of the injury had been known beforehand. The case may serve, however, to enable us to discuss the general question as to the expediency of trephining in simple depressed or comminuted fracture, accompanied or not by symptoms of compression or other cerebral injury. It is hardly necessary to remark that a fracture of the skull derives its chief importance from the concomitant or subsequent injury which is sustained by the intracranial contents; and just as no prudent surgeon would dream of converting a simple fracture of the leg into a compound one for the sake of obtaining an accurate adjustment of the fragments, so the plea for preventive trephining in cases of simple depressed or comminuted fracture of the cranium, without head symptoms, is based upon the supposition that, by operating, the danger of subsequent cerebral mischief will be averted. I cannot admit the force of this argument, which seems to me to undervalue, on the one hand, the resources of nature, and, on the other hand, the risks inseparable from surgical interference. Every surgeon present has, doubtless, met with examples of simple depressed fracture, in which no alarming head symptoms were present, and in which permanent recovery took place without any active treatment. Surgical literature abounds in such cases. Textor cites twelve instances of depressed fracture verified by post-mortem examination, in seven of which the depression was complete, involving both tables, and in all of which recovery had taken place without any impairment of the cerebral functions. Similar observations have been recorded by Erichsen, Nunn, Bruns, and many other trustworthy writers.

In cases of simple comminuted fracture, without marked depression, but with considerable displacement of the fragments, early trephining is sometimes advocated, on the ground that, unless the loose pieces of bone are removed by

operation, they will probably become necrosed, and thereby set up fatal intracranial inflammation. But neither of these statements is confirmed by experience. We can rarely feel certain that the comminuted portions of bone, even though freely movable, are completely detached from their vital connections; for they may still be adherent to the pericranium. But, admitting their isolation to be complete, it is conceivable that their vitality might yet be preserved by newly-formed attachments to the surrounding parts. In support of this view, I may cite a case lately published by Prof. Macewen, of Glasgow, who, having applied the trephine in a compound depressed fracture of the skull, took a piece of the inner table which had been completely detached, and laid it in the trephine-aperture. The transplanted bone caused no irritation, and the wound healed without any signs of inflammation. Nevertheless, it can not be denied that necrosis may occur under the circumstances above mentioned, although it is comparatively rare, when the fracture is simple. It must also be granted that, when occurring, the suppurative action excited by the presence of the dead bone may extend to the membranes of the brain, causing fatal complications. But there are so many recorded examples of necrosis following gunshot injuries of the head, in which very large pieces of necrosed bone have been removed without the occurrence of cerebral symptoms, that preventive trephining can hardly be defended unless it can be shown to be an operation free from serious risk.

The performance of the operation, in cases of simple depressed fracture, without head symptoms, with the object of removing sharp fragments of the inner table which it is assumed may have penetrated the membranes of the brain, or perhaps the brain itself, seems to me also quite unnecessary. It is true that in severe cases of simple

fracture the internal table is often very extensively injured ; and Bergmann has aptly remarked that a mere inspection of museum specimens might lead one to infer that simple fractures were graver injuries than those which are compound. But clinical experience proves that these extensive osseous lesions are often recovered from without surgical interference.

On the whole, then, it would appear that the apprehensions felt by those who advocate preventive trephining in the circumstances mentioned are scarcely justified by observation. And, if this fact is admitted, the propriety of performing the operation of trephining must be considered as, at least, very doubtful. If our means of diagnosis were more exact, and if we were able to predict what cases would turn out badly if left to nature, active interference would often be an obvious duty ; but, in the absence of such knowledge, it seems unjustifiable to subject the patient to an operation which must convert a simple into a compound fracture, with its attendant dangers of suppuration in close proximity to vital parts. Although a firm believer in the excellence of antiseptic surgery, I regard the unbroken skin as a surer protection to the deeper parts, than the best surgical dressing that has yet been invented ; and when we remember that, occasionally, even in careful hands, accidents occur in performing the operation, such as wounding the dura mater, or perhaps the brain, or one of the larger sinuses, we have still further reason to follow the conservative method of treatment which is sanctioned by the teaching and experience of the great majority of living surgeons.

The course which should be pursued in cases of simple fracture of the cranial vault, accompanied by head symptoms, is by no means easy to decide. The unknown quantity vaguely expressed by the term "head symptoms"

often leaves us quite in the dark regarding the seat, nature, and extent of the traumatic lesions, so that we cannot foretell whether the operation of trephining will prove beneficial, useless, or injurious. In endeavoring, however, to arrive at a definite conclusion on this point, there are certain well-known pathological and clinical facts which may sometimes guide us. Compression of the brain resulting alone from a fragment of depressed bone is rarely of long duration. Often, as has been remarked, considerable depression exists without any interference with the cerebral functions; and even when the depressed bone causes symptoms of compression, these frequently disappear gradually as the cerebro-spinal fluid becomes displaced or absorbed, and the circulation in the brain is restored to its natural condition. Hence, even when we trephine successfully in cases of depression, we cannot always be sure that the favorable result is due to our intervention. This point is happily stated by Dieffenbach, who records his experience in the following words: "A boy fell from the first story down upon a stone pavement, and received a fracture of the right parietal bone, of which a piece three inches in circumference was depressed several lines in depth. He lay comatose. I trephined him; he recovered, and I believed that I had saved his life by the operation. A year later he fell from the same place, and struck again upon the stone pavement, this time breaking the left parietal bone, just as he had before broken the right one. He recovered without trephining; again I believed that I had saved his life; and I began to think that he had shown much endurance at the time when he survived the operation."

It has been clearly shown that in severe cases of simple depressed fracture, accompanied with marked and prolonged signs of compression of the brain, other lesions usually co-exist, such as contusion or laceration of the brain, or

hæmorrhagic extravasation, which may take place between the dura and the skull, in the arachnoid cavity, in the substance of the brain, or on its surface, from the vessels of the pia mater. If we except those rare instances in which the compression is due solely to an extravasation between the dura and the cranium, we shall have no reason to expect that benefit would result from the application of the trephine. So far as the brain substance is concerned, the damage it has sustained is beyond the reach of mechanical aid; its integrity, if restored, will be slowly regained, as in cases of ordinary apoplexy, by absorption of the extravasated blood. And the same process goes on in favorable cases when blood is effused upon the surface of the brain. We have probably all seen examples of coma lasting for days or for weeks after head injuries, but which yet ended in recovery, due, as we may fairly presume, to the gradual disappearance, by absorption, of the extravasated blood. When we consider how large a quantity of blood is often poured out within the cranium in cases of fracture, we can not avoid the inference that the compression which it exerts is far greater than ever occurs from any depression of bone that we should think of treating by operation. In such cases trephining would be useless, either in consequence of the depth of the extravasation or because, being widely diffused over the surface of the brain, the effused blood would not escape through the artificial opening made in the skull. Furthermore, the operation might in some cases prove injurious, by provoking meningitis. In other words, the very facts which have been urged as affording an indication for the employment of the trephine in cases of simple fracture may, in my judgment, be used as an argument against the propriety of the operation. I refer to the gravity of the injury, and the severity of the symptoms. Where the fracture is of great

extent, and accompanied with severe contusion or laceration of the brain, or with copious intracranial hæmorrhage, it is extremely doubtful whether the trephine can ever be employed with advantage; while the operation must, by increasing the mechanical injury and by favoring the occurrence of suppuration, add not a little to the already existing danger which threatens the patient's life. Perhaps I do not fully appreciate the comparative safety which attends the performance of the operation according to modern antiseptic methods; but I believe that in this class of cases future experience will prove active interference to be of doubtful utility.

There are two conditions, however, either one of which, when present, renders imperative an immediate resort to the trephine. One of these is the case in which the fracture is of limited extent, and in which there is reason to think, from its situation or from the occurrence of monoplegia, monospasm, or hemiplegia, that a splinter from the inner table may have penetrated the motor tract of the cerebral cortex. But, as we have seen, the fractures which are attended with such displacement of fragments of the inner table are usually of small extent, and are almost invariably compound. The other case is the one in which compression of the brain is caused by an accumulation of blood between the dura mater and the cranium. Such an accumulation may result from a wound of one of the larger venous sinuses, but in a large majority of instances it depends on a wound or a laceration of the middle meningeal artery. The accident is most frequently accompanied by a compound fracture; but it may be met with in cases of simple fracture, and occasionally when no fracture is present. When there exists a compound fracture, the blood usually escapes through the external wound, thus rendering the diagnosis easy; but, when the fracture is simple, or when

the artery alone is injured, the extravasated blood separates the dura mater from the cranium, and may be poured out in sufficient quantity to cause fatal compression of the brain. The amount of blood thus extravasated may be as much as half a pint. When the brain has not sustained severe injury, and the symptoms of concussion are but slight, the signs of the arterial lesion may be quite characteristic. After a blow has been received, usually in the temporo-parietal region, the patient, although, perhaps, slightly stunned, soon regains consciousness, and exhibits no marked signs of cerebral injury. But, after the lapse of a few minutes, or possibly several hours, symptoms of compression appear, and soon become very marked, the patient often dying within twenty-four hours from the time of the accident. Hemiplegia sometimes occurs before insensibility is complete; and its detection is important, for the reason that a blow upon one side of the head has been known to cause a rupture of the artery on the opposite side. The accident affords a clear and positive indication for the application of the trephine; yet there are but few recorded cases of the operation. Adding one recent case to the list compiled by Bergmann, there are one hundred well-authenticated examples of hæmorrhage from the middle meningeal artery. Of these seventeen ended in recovery, and in twelve out of this number the blood escaped through an external wound. Of the remaining five, one recovered without operation, the diagnosis being confirmed by autopsy when the patient died three years later of pneumonia. The other four recovered after operation, the blood being evacuated through the trephine opening. In one of those cases, that of Hueter, the bleeding artery was secured by a ligature.

The four cases of compound depressed fracture may be related in a few words.

CASE II.—A girl, aged fourteen, entered the hospital February 14, 1882, having been kicked on the head by a horse shortly before admission. Compound depressed fracture of frontal bone, just above superciliary ridge. Depressed portion measured half an inch by two inches. Patient unconscious. Trephine applied on outer side of depression by Dr. Parmly, house surgeon, and depressed bone elevated and several loose fragments removed. Cat-gut drainage; salicylated cotton dressing; wound closed by sutures. Patient became conscious soon after operation, and had no head symptoms afterward. Temperature never rose above 100° F. Discharged, cured, February 28th, fourteen days after injury.

CASE III.—Male, aged twenty-three, entered hospital June 22, 1882. Fifteen minutes previously was kicked by a horse, the injury sustained being a compound fracture of left side of frontal bone, just above superciliary ridge; was able to walk into hospital, and showed no signs of concussion. Right pupil dilated. A portion of bone one inch by three-quarters of an inch comminuted and depressed. Ether. By means of trephine, gouge-forceps, and elevator. Dr. Weed, house surgeon, removed depressed fragments and smoothed off sharp edges of bone, leaving aperture five-eighths by one inch and a quarter. Dura uninjured; cat-gut drainage; silk sutures; iodoform dressing. No bad symptoms. Wound healed, and patient discharged, cured, July 6th, fourteen days after accident.

CASE IV.—A man fell eight stories, and was brought to the hospital, comatose, October 3, 1882. Had compound fracture of the right femur, compound fracture of right parietal bone, and fracture of spine in upper dorsal region, the latter injury not being discovered until after death. Pieces of bone impinging on dura mater removed by Dr.

Weed, house surgeon, leaving oval opening one inch and three-quarters in length. Patient remained comatose, and died thirty-six hours after admission.

CASE V.—Man, aged fifty; admitted October 22, 1882. While under influence of liquor, fell upon a stove, striking the back of his head, and sustaining a compound depressed fracture in occipital region on left side, just above superior curved line. Depressed bone measured three-quarters by one inch and a half. Much comminution of both tables, especially the inner. No head symptoms; no wound of dura. Operation by my assistant, Dr. King. Patient etherized, depressed fragments removed, and the edges of aperture made smooth with gouge-forceps. Catgut drainage; wound washed out, as in previous cases, with five-per-cent. solution of carbolic acid, and closed with silk sutures; iodoform dressing. Patient progressed favorably, and was discharged, cured, November 5, 1882, fourteen days after admission.

Of these four cases it may be observed that the third one was evidently hopeless when admitted, and that any operation under the circumstances was inexpedient. The remaining three are familiar examples of recovery after trephining in compound fractures of limited extent, accompanied with depression and comminution of the bone, but not attended with any signs of serious injury to the brain. I believe that in such cases trephining is plainly indicated, and that many lives, which would otherwise be lost, are saved by the operation, which, by elevating depressed fragments, by removing fragments that are loose or sharp, and by permitting thorough antiseptic irrigation of the wound, reduces to a minimum the risk of intracranial inflammation, so greatly to be dreaded in this class of cases. To insure success, however, the operation should be performed soon after the injury, and with strict antiseptic precautions. I

recall an instance in which, many years ago, I unfortunately delayed the operation until the third day, in consequence of the entire absence of head symptoms. When these occurred, I trephined, but lost the patient, who, I believe, might have been saved by earlier interference. If trephining has not been performed soon after the accident, and the wound seems to be doing well, I should consider it objectionable to disturb it at a later period, unless an operation were indicated by the occurrence of decided symptoms pointing to intracranial mischief, as I have seen cases of recovery from compound depressed fracture in which the bone was not elevated. But I do not remember to have met with such an instance except in children, who, as is well known, bear head injuries much better than is the case with adults.

While believing that trephining is to be recommended in all cases of compound fracture in which the depression is marked, but of no great superficial extent, and in all cases of punctured fracture when there is reason to suspect that the internal table is extensively splintered or depressed, I am strongly opposed to active interference when the fracture is of great extent, and when the depression is not limited or abrupt. It is true that these cases are usually fatal; but I am sure that nothing can be gained by the extensive operative procedures that would be involved in any attempt to remedy the displacement. Aside from those cases in which the brain has suffered irreparable damage, I think that in future many successes will be obtained by careful antiseptic treatment of the wound, such as recommended by Lister in the management of compound fracture of the bones of the extremities. The most scrupulous cleansing of the wound, the arrest of hæmorrhage, the removal of foreign bodies, loose fragments of bone, and of detached portions of brain matter, if present, followed by proper

drainage and dressings, is, in my judgment, the only means which, with our present knowledge, promises any benefit in this nearly desperate class of injuries.

In the two cases that complete my list, trephining was performed at a period remote from the date of the accident.

CASE VI.—William G., aged twenty-six, entered the hospital June 26, 1882. Nine years ago was struck on the head by a piece of slate weighing one pound and a quarter. Became immediately unconscious, and remained in bed several weeks. When consciousness returned, left hemiplegia was observed; this remained nearly complete for seven months, after which it gradually diminished, and nearly disappeared. A few weeks after injury, began to suffer from epilepsy, and has ever since been liable to frequent attacks. Left hand somewhat weak; unable to contract index finger. Patient lively and talkative, but mind evidently impaired. On right side of head, near the parietal eminence, is a depression of bone, about one inch and a quarter in diameter. Its right edge is one inch and a half from median line, and its centre just in front of the Rolandic line. Depth of depression at centre greater than elsewhere, and estimated to be one-quarter of an inch. Scalp over depression marked by a crucial scar, the point of crossing corresponding with its deepest part.

June 27th.—Operation.—Bone exposed by a crucial incision, and trephine applied just behind margin of depression. Piece removed was 5 millimetres in thickness. By means of gouge-forceps, the depressed bone, as well as that adjacent to it, was removed, leaving a nearly circular aperture measuring $4\frac{1}{2} \times 5$ centimetres. The depressed bone was quite vascular, and was considerably thickened, being 12 millimetres in thickness at its central part. No adhesions between bone and dura; no morbid conditions discovered

besides those already mentioned. Wound closed by silk sutures without drainage ; iodoform dressing. Before and after operation patient took daily 90 grains of potassium bromide. Recovery took place without a bad symptom, the temperature never exceeding 100° F. The dressing was not changed until the end of a week, when complete union was found to have taken place externally. The scalp was considerably elevated, however, by a fluid accumulation beneath it, which was probably either blood or serum, as it disappeared by absorption in the course of the following week, at the end of which time the patient left the hospital, in about the same condition, as regards want of mental and muscular power, as when he was admitted.¹

This case was sent to me by my friend, Prof. Seguin, who advised the operation as a last resort, medicine having failed to afford the desired relief. What permanent benefit will result from the removal of the depressed and thickened bone it remains to be seen ; yet I anticipate little, if any. It seems far more rational to ascribe the patient's symptoms to textural alterations in the cerebral convolutions, resulting from the primary injury, than to assume that they were due to the slight diminution in the size of the cranial cavity, caused by the depressed and hypertrophied bone. Twenty years ago I assisted Prof. Willard Parker in operating on an epileptic girl, who had been subject to paroxysms since her early childhood, and who had a well-marked hypertrophy of the parietal bone, situated near the vertex. The bone was an inch in thickness at its middle part, and projected both externally and internally, the internal projection being estimated to be three-eighths of an inch

¹ A letter dated March 25, 1883, has just been received from the patient's father, stating that the operation has been followed by some amelioration of his condition, the epileptic seizures being somewhat less violent, the headache less intense, and the weakness of the right hand less marked.

beyond the normal plane of the internal table of the skull. The tumor was completely removed, leaving a circular aperture which was two inches in diameter. The dura mater was healthy, and not abnormally adherent. Recovery from the operation was speedy and satisfactory; but a month later the fits returned, and six months afterward became as frequent and violent as before. In this case there was no history of injury, and, therefore, there was greater reason to hope that an operation would prove beneficial.

CASE VII.—Margaret F., aged thirty-nine, married (?), was sent to me by Dr. R. W. Amidon, who saw her early in November, and has furnished the following notes of the case: “ ‘Bright's disease,’ three or four years ago (swollen feet, backache); was sick nine months. Five weeks ago struck head (left parietal region) against sharp corner; was knocked down and dazed, but not stunned; no fit at time; no signs of fracture or concussion; thinks there has always been a lump there since.

“ Two weeks after injury had a ‘fit’; lost consciousness, and fell. Since then, at intervals of about a week, has had short epileptic attacks, preceded by queer feeling in tongue, sensation of pins and needles in right hand; then an inversion of right hand, and loss of consciousness; a fall, tongue bitten, etc. Loss of consciousness very short—three to four seconds. Afterward feels weak, and sleeps. Thinks that right hand has lost strength; has headache in right fronto-parietal region; denies syphilis; on examination, right side of face weak; tongue straight when protruded; grasp of left hand nearly as strong as right (25–30); a doubtful limp in right leg; tenderness over site of injury, which patient indicates as over middle third of ascending parietal convolution; slight aortic direct murmur; ophthalmoscopic examination shows optic disc not choked.

“ *Diagnosis.*—Traumatic epilepsy.

" *Treatment*.—Potassium bromide.

" *November 13th*.—Sent to Dr. Sands for operation."

December 18th.—Has been under treatment with bromide of potassium, in ten-grain doses, t. i. d., for some time. Has severe headaches, and at times a piercing pain just at the point of injury. Has had no convulsive attack since admission, and has been going about the hospital ward. Discharged improved.

January 13, 1883.—Readmitted. Has pain on left side of head. Is aphasic at times, and shows some loss of power in both arms. Has fits, and during the fits says she froths at the mouth and bites her tongue.

16th.—Last night had a severe headache, and could not sleep on account of pain.

17th.—Slight facial paralysis of right side. Naso-labial fold narrowed. The tongue in protruding deviates to the right side.

18th.—Both pupils dilated to one-fifteenth of an inch. The left pupil contracts moderately on exposure to light. The right less so. Neither responds perfectly.

20th.—Is very stupid, and sleeps most of the time. Ordered sol. potass. brom. 3 j every four hours.

29th.—More aphasic. Has an acne-eruption over face, probably due to potass. bromide.

February 1st.—Examination with ophthalmoscope shows choked optic disc on both sides. Dynamometer shows left hand 30 and right hand 26. No exact diagnosis was made either by Dr. Amidon or myself as to the character of the lesion presumed to exist; but we agreed that an explorative operation would be proper, in the hope of discovering a detached splinter of bone from the inner table, a chronic abscess, or some other morbid condition admitting of relief by mechanical means.

6th.—Ether; operation; Dr. Sands.

The scalp being shaved, an incision was made on left side of head, about two inches above the ear, in a direction parallel to the zygoma. The incision was about two and a half inches long. The largest sized trephine was applied nearly opposite the Rolandic line, and a button of bone removed, about a quarter of an inch thick. Nothing was found, excepting that the dura mater was apparently thickened. The incision was extended for about an inch in a direction downward and outward, and the trephine aperture enlarged by means of gouge-forceps. Pulsation of dura absent; no fluctuation could be felt. A large hypodermic needle was thrust through the dura in three different places to the depth of an inch, but nothing withdrawn. In making two of the punctures, however, the needle met with considerable resistance, and the idea of a tumor was suggested. When all bleeding had stopped, wound was closed with fine catgut sutures, except at upper part, which was left open. Iodoform dressing.

9th.—Patient speaks very indistinctly, and not loud enough to be heard at any distance. Was reported as being delirious last night. Apparently more aphasic than before the operation.

10th.—Less aphasic.

11th.—Patient delirious at times. P. M., patient very noisy, and disturbs the ward. Magendie's solution, ʒ x.

12th.—Patient had to be tied in bed on account of delirium. 3.30 P. M., wound dressed under spray, and found to be perfectly clean. Union had taken place throughout. Redressed with carbolized oil, 1-12.

13th.—Slept tolerably well last night. This morning is very delirious. Magendie, ʒ x, administered hypodermically.

14th.—Patient this morning was cyanotic. Respiration, 7; pulse 120 and strong. Pupils contracted and not re-

sponsive to light. Ordered atropiae sulph. gr. $\frac{1}{16}$. After taking one dose, respiration, 16. Took two more doses before 12 M. After this time, respiration, 4. 2 P. M., respiration, 5; pulse, 140. At 11 P. M., died. Temperature, after operation did not exceed 99° , until the day before death, when it suddenly rose to 103° F.

Report of autopsy by Dr. Delafield:

"*Body.*—Fat.

"*Head.*—A wound upon left side of head which has united, though not firmly, throughout. The wound runs from about two inches above the ear forward parallel with the zygoma. Beneath this the bone has been removed. The wound in the bone is in the left parietal bone near its lower edge. The upper margin of the squamous portion of the temporal bone has been cut through. The opening through the bone is about one inch and a half long, three-quarters of an inch broad. The edges are clean cut. The space thus left between the scalp and the dura is filled with some reddish, partly organized clot, and there is a very little pus at the edges and in the upper fibres of the temporal muscle. The dura beneath is adherent to the pia.

"*Brain.*—The portion of dura adherent and just under the wound lies over the middle of the posterior central convolution, and extends a little posterior to it. The fissure of Rolando is not touched by it, but lies a few lines in front. There seems to be no meningitis.

"Just beneath adherent dura, in posterior central convolution, and in convolution just behind it, is a gummy tumor about one inch in diameter.

"*Heart, liver, spleen, lungs, kidneys, and stomach* are normal.

"Fallopian tube of left side terminates in a cyst containing a foetus."

On reviewing this interesting case in the light of the

post-mortem revelation, which seems to indicate a syphilitic origin of the cerebral tumor, it is certainly a subject of regret that the true nature of the disease escaped observation during life, as possibly it might have been controlled by specific treatment. But neither Dr. Amidon nor myself was able to obtain a syphilitic history, or to discover any existing specific lesion. Certainly the symptoms were very misleading. No convulsive seizure or other sign of cerebral trouble preceded the injury to the head, which was inflicted directly over the psycho-motor centres, and which was followed, after the lapse of a fortnight, by epileptiform attacks in which the convulsive moments were strictly limited to the upper extremity on the side of the body opposite to that where the blow was received. Assuming the morbid growth, however, to have been syphilitic, it must be a matter of conjecture whether the injury acted as an exciting cause and determined its development, or whether the causative relation was the reverse, the injury having been due to a fall which occurred when the first epileptic fit was occasioned by the already existing gummy tumor. The case is instructive as demonstrating the value of cerebral localization in determining when the trephine should be applied. At the time of the operation the patient suffered from aphasia, impairment of vision, facial paralysis, and partial paralysis of the tongue, as well as from paresis of the right upper extremity; but, as the affection of the upper limb was observed some time before the other nervous disturbances occurred, it was believed these latter symptoms were due to secondary changes, perhaps to pressure or œdema, and that the primary cause would probably be found in the centre governing the movements of this part of the body. The post-mortem examination verified the accuracy of this conclusion, and showed that the tumor occupied the centre referred to, and that it lay directly beneath

the opening made by the trephine. Finally, although the autopsy disclosed no evidences of cerebral inflammation excited by the operation, the active delirium which set in toward the close of life may possibly have resulted from encephalitis; and it seems certain that death, although inevitable, was hastened by the undue effects of a dose of morphine, administered with the object of relieving this distressing symptom.

CASE OF COMPOUND COMMINUTED FRACTURE OF THE SKULL, WITH WOUND OF THE SUPERIOR LONGITUDINAL SINUS
—LATERAL SUTURE OF THE VEIN.
WOUND—RECOVERY.

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HAVING read with great interest the paper of Dr. Lewis S. Pilcher, in the August number of the *ANNALS OF ANATOMY AND SURGERY*, on "The Lateral Closure of Incomplete Vein-Wounds," it has seemed proper that I should place on record another instance of the lateral closure of a wound in a large venous trunk, followed by a favorable issue.

CASE.—Barney Burns, single, white, twenty-seven years of age, laborer, native of the United States, was admitted to the Cook County Hospital, June 20th, at 4:50 P. M., suffering from a compound comminuted and depressed fracture of the skull. Patient has always enjoyed good health; no hereditary taint, nor venereal accidents. Has been a moderate drinker,

but was not under the influence of liquor at the time of the accident.

History of Accident.—While working on the new Burlington Railroad office, several bricks fell from the top of a wall, one of which struck him on the head, prostrating him, but not so that he lost consciousness. The hæmorrhage was then quite profuse ; a few rude attempts were made to control it until he was conveyed to the County Hospital.

On admission his general condition was fair ; hæmorrhage had nearly ceased, looked otherwise in good health.

On examination a lacerated wound of scalp was found about two inches in length, of general triangular form, over right parietal bone, above and posterior to the parietal eminence, extending to the median line; also a depressed fracture one and a half inch in diameter, oval in form, in same locality was made out. There was sensation of numbness and loss of motion in both upper and lower extremity—left side. Dr. Parkes had the patient immediately anæsthetized, and after enlarging the external wound slightly, four fragments of the external table of the skull were removed. This operation was followed by such terrific hæmorrhage that no further attempt was made to remove other fragments. The hæmorrhage coming from the superior longitudinal sinus was controlled by packing wound with gauze, and applying a compress. Several small vessels of scalp were also twisted.

June 21st, A. M.—Pulse 74, temperature 99.2. During night patient vomited several times, otherwise was in fair condition; took milk and beef tea in small quantities. Has no pain, nor has hæmorrhage again occurred. Paralysis yet remains in left lower extremity ; slight paresis of left upper extremity ; sensation yet unimpaired.

21st, 10:50 A. M.—Without ether, Dr. Parkes removed compress and gauze, and extracted three fragments of the internal table and one of the external table. Hæmorrhage again occurred from a perforation in superior longitudinal sinus about size of a coffee grain. This was closed by three catgut sutures, perfectly controlling the hæmorrhage. Slight compress of gauze again applied ; scalp wound partly closed by one silk ligature ; the whole retained by bandage.

The fragments taken from inner table of skull were four in number.

The fragment from the external table was the fifth frag-

ment from that table. After operation, perfect quiet was ordered; milk and light diet. P. M.—Redressed; slight hæmorrhage from dura mater; compress reapplied; paralysis same; urine passed voluntarily; bowels not moved.

22*d*, A. M.—Pulse 56, temperature 99.3. Redressed; no hæmorrhage; no more fragments of bone; compress is now laid on outside of scalp. P. M.—Pulse 56, temperature 99.4.

23*d*, A. M.—Pulse 56, temperature 100.3. Condition good, slight headache; takes nourishment well; removed scalp sutures. P. M.—Pulse 62, temperature 103. Quin. gr. v. t. i. d.

24*th*, A. M.—Pulse 54, temperature 101. Bromide pot. gr. xv. p. r. n. Patient very restless during night; vomited, but feels much better to-day. R Quin. gr. v. t. i. d. R Pulv. glycyrrhizae co. 3 ii. R Pot. bromide p. r. n. P. M.—Pulse 76, temperature 103. Redressed; enema; sponge bath; wound looks well.

25*th*, A. M.—Pulse 56, temperature 100.8. P. M.—Pulse 76, temperature 100.5. No change in paralysis.

26*th*, A. M.—Temperature 99.8. Redressed; slight suppuration; sutures have not been absorbed; condition of patient good. P. M.—Pulse 55, temperature 100.6.

27*th*, A. M.—Pulse 55, temperature 99. No headache.

28*th*, P. M.—Pulse 62, temperature 104.2.

29*th*, A. M.—Pulse 64, temperature 101. Last night slight erysipelations; redness on left cheek; chills yesterday P. M.; ordered hot fomentations and quinine gr. xv. at night; wound looks well; redness in face is less; slept well and has no pain; ordered hot boracic acid fomentations to erysipelas. Quin. gr. v. Sal. rochelle 3 s. t. i. d.

29*th*, A. M.—Pulse 78, temperature 101.6. Patent removed to erysipelas department to-day. Find left eye and cheek implicated in the erysipelas which seems to be spreading up to head. Painted a line with tincture iodine around disease on margin of scalp; hot fomentations of boracic acid to be continued; ordered quinia sulph. gr. v. and tr. ferri chlor. gtt. xv. every four hours.

30*th*, A. M.—Pulse 70, temperature 100.8.

July 1*st*, A. M.—Pulse 58, temperature 99.2.

2*d*.—Pulse 60, temperature 99. Appetite better; sleeps well; bowels not moved; enema and castor oil ordered; gaining strength in lower extremity daily; complains of headache in occipital region.

3d.—Pulse 70, temperature 100.2 ; headache greater part of night ; slept fairly ; feels better this morning ; face better ; redness and swelling nearly gone.

4th.—Pulse 80, temperature 99.5.

5th.—Pulse 72, temperature 100.

6th.—Pulse 72, temperature 98.6.

20th.—Pulse and temperature normal. Temperature continued normal in morning with slight evening exacerbation until present time, when it is normal. Headache continued slight until to-day ; now gone ; paralysis gone ; no pain—no inconvenience whatever ; says he is all right ; only slight loss of motion remaining in toes of left foot ; dressed head ; from right and lower margin removed piece of bone, which was found protruding and loose ; from this time on several small pieces were removed, evidently fragments that had become necrotic on the edges.

August 12th.—Dressed daily ; solid base ; no more spiculæ. From this time on till his discharge—September 8th—the cavity continued to fill up ; pain disappeared ; no suppuration, and motion and sensation returned almost completely in the affected extremities. When discharged there was still a depression in which two fingers could be laid, but the patient felt perfectly well and strong.

REMARKS.

The above case seems of interest to me, in that, I have failed to find any reference to the plan adopted in closing the extensive wound in the superior longitudinal sinus in any surgical works at my command. The bleeding in this case was truly fearful, and followed immediately upon the slightest separation of the depressed fragments in attempting their elevation ; so much blood was lost and so rapidly, that the patient became completely exsanguinated, and was almost pulseless ; so I deemed it best to defer the final removal of the fragments until the patient rallied from the effects of the hæmorrhage. At the second attempt all the fragments were rapidly removed, and an opening, easily admitting the end of the little finger, found in the upper wall of the superior longitudinal sinus, formed by a complete loss of wall tis-

sue. Through this hole the blood welled out in large quantities. The flow was stopped, temporarily, by a piece of sponge, and the removal of all bone fragments accomplished, together with an elevation of the depressed but undetached margin of the opening in the skull. No injury to the membrane was found other than the opening in the sinus. It was determined to close the opening in the sinus by drawing the edges thereof together with fine catgut sutures. Three such sutures closed the opening entirely and perfectly controlled the loss of blood. The calibre of the sinus was reduced fully one-third. A well-marked bulging of the sinus was noticeable at the anterior end of the closed wound, where the sinus was fully distended by the pressure and backward flow of its contents. Towards the posterior portion a crease extended some distance from the wound formed by an infolding of sinus wall. The patient experienced no pain whatever during the passage of the needle through the dura mater or during the pinching with forceps in trials to ascertain whether the edges of the wound could be approximated. The injury to the skull and pressure of the depressed bone was, as nearly as could possibly be determined, directly over the fissure of Rolando, implicating the highest points of the ascending frontal and descending parietal convolutions of the cerebrum. The immediate effect was complete paralysis of motion of left upper and lower extremity and slight interference with sensation. The trouble in the upper extremity disappeared entirely in a few hours; that in lower extremity persisted sometime longer, as is shown in the above history. At the present day the patient has remaining a slight inability to extend the toes; otherwise he is apparently an able-bodied man. Notwithstanding he passed through a pretty severe attack of facial erysipelas—the wound in the scalp never became implicated. It was dressed antiseptically. The dif-

ference in the size of the fragments belonging to the outer and inner tables of the skull displays very perfectly the effects of injuries to the skull. The inner table bears the burden of injury and always shows the largest fragments.

TRACTION SUTURE.

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IT not infrequently happens when a large portion of integument has been cut away—as in removal of the female breast—that the healthy borders cannot be fully approximated; and even an attempt to do so is accompanied with such a degree of tension that the sutures soon cut their way out. To distribute this tension, I have employed the following device:

After drying the skin thoroughly, I apply strips of adhesive plaster from the margin of the wound in the direction I wish the sutures to hold. I then pass my needle deeply through plaster and skin. After the sutures are in position, and before tightening them, I request an assistant to approximate the margins of the wound by pressure from his hands, while I secure them by twisting the wire.

Sutures employed in this manner have a firm hold upon the plaster, exert their traction upon a large surface, are less irritating and harmful, and will continue an efficient action much longer than the ordinary integument sutures.

HISTORICAL AND BIBLIOGRAPHICAL NOTES.

A SERIES OF SKETCHES OF THE LIVES, TIMES AND WORKS OF THE OLD
MASTERS OF ANATOMY AND SURGERY.

By GEORGE JACKSON FISHER, M.D.

XXI. ABÛL-CÂSEM CHALAF EBN-ABBAS AL- ZAHARAVI, COMMONLY CALLED ALBUCASIS.

1060—1122.



LBUCASIS gives the operation of extracting the dead foetus from the uterus, by embryotomy, in almost the same words as it is described by Paulus, which will be found in my sketch of this ancient Greek surgeon. Albucasis relates a case of extra-uterine pregnancy that came under

his own observation. A woman being pregnant, the foetus died without delivery, and subsequently an abscess formed at the navel, and coming to maturity, discharged, to his great surprise, not only pus but the bones of a foetus. The mother lived many years after this event, a fistulous opening always remaining from which a purulent discharge never ceased to flow. This is one of the earliest, if not the first case of the kind on record.

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The work of Albucasis contains drawings of the instruments used in his time for obstetrical operations. Among them are several forms of forceps, but as they all have teeth, it is to be presumed that they were used only for delivering the fœtus when dead. It is to be regretted that he has entirely omitted the forceps mentioned by Avicenna (*Chirurg. ii.*, 76 and 77). These rude and curious figures of obstetrical instruments are all copied in a rare book entitled *Gynæciorum, hoc est, De Mulierum tum alii, tum gravidarum, parientium et puerperarum affectibus, etc.*, 4°, Basileæ, 1566. This is a collection of works on the subject of obstetrics, made by Caspar Wolph. One of the books is extracted chiefly from Albucasis, the figures of twelve instruments, including a speculum uteri, several forceps, hooks, and cutting instruments, are to be found in Chapter 72.

Fistulæ are treated of by Albucasis at great length. He advises making free incisions, and the removal of pieces of diseased bone which chance to be found at the bottom of the sore. He relates a case of fistulous ulcer in the thigh, to cure which he removed large pieces of bone, sawing it down as far as the marrow. Some of his saws are of very ingenious construction, one of them being very like that known to us as Hey's saw. He enumerates nine specific causes which prevent the healing of wounds. Space will not permit me to repeat them.

In the treatment of hæmorrhoids Albucasis prefers excision and burning, but if the patient will not submit to these methods of cure, he then resorts to the ligature. Excision is done by seizing the pile with a hook and cutting it at its base, after which styptics are applied. He applied the ligature by transfixing the base of the hæmorrhoid with a needle armed with a thread (*Chir. ii.*, 81). He gives full directions for the use of the actual cautery (*p. i.*, 37).

In operating on an imperforate anus, our author advises,

after incision, the introduction of a leaden canula to prevent closure of the artificial opening.

Amputation of the extremities in cases of mortification was practiced in the days of Albucasis. When the disease is seated in the hand, he recommends us to amputate at the fore-arm; when in the fore-arm, at the elbow; and if the arm itself be affected, he considers the case to be hopeless.

- The same view is taken in regard to the lower extremities, all cases of mortification above the knee he pronounced incurable. In performing the operation, he directs us to apply two bandages around the limb, one above and the other below the point selected for the amputation. These bandages are to be pulled by two assistants; the former upwards and the latter downwards, in order to put the skin upon the stretch; the fleshy parts are then to be divided with a large scalpel down to the bone, which is then to be cut out or sawed across; and, before this is done, a retractor of linen is to be applied around all the fleshy parts to prevent injury by the sawing. Should any hæmorrhage occur during the operation, he directs us to apply the cautery, or a styptic powder, and, after the operation, he has the limb properly bandaged until the stump is healed.

The imperfect state of surgery in his time, and the timid practice of our author, are illustrated by a case related by Albucasis. A person who had a spreading mortification in the foot, cut it off himself at the ankle-joint, and was cured for the time. The disease next attacked the hand, upon which he applied to Albucasis, requesting that he would cut it off in the same manner, but this he refused to do, for fear that the man's strength might not be able to endure the operation. He afterwards learned that the man had cut off his whole hand, and had recovered (*Chirurg. ii.*, 89).

Albucasis gives a very full account of the modes of extracting various weapons. He also relates some interesting

cases of recovery from very severe wounds. An arrow entered at the root of a man's nose, and was extracted by Albucasis behind his ear; the man recovered without injury to the eye. He extracted another large arrow which had lodged deep below the eye of a Jew; and, in this case also, the sight was not impaired. He extracted a barbed arrow, which had lodged in the throat of a Christian, by enlarging the wound, and the man recovered.- An arrow had lodged in a man's belly, so that, at first sight, Albucasis considered the case as hopeless; but, after thirty days, as no mortal symptoms had supervened, he enlarged the wound and extracted the weapon. He says he saw a man who got an arrow lodged in his back; the wound healed, but, after an interval of seven years, the weapon came out below his buttocks. He knew a woman who had an arrow lodged in her abdomen; the wound healed, the weapon never afterwards occasioned her any inconvenience. He also relates that he finally extracted an arrow, which had been buried in the nose of a prince, after making various fruitless attempts for the space of four months.

He gives many sensible directions for removing arrows which are driven into bone, for the use of the probe, the trephine, etc. He concludes with giving drawings of various forms of forceps, and instruments called impellents (*Chir.* ii., 96).

There is nothing of special note in the works of Albucasis that is not to be found in Paulus Ægineta, and still more ancient authors, concerning fractures and dislocations of the bones. He says that fracture of a bone is recognized by the derangement of the broken pieces, by their projection, and the crepitus produced upon pressure. He remarks, however, that there may be a splitting or fissure, without displacement or crepitus. In fractures of the skull with depression, Albucasis resorted to the trephine. The drawings

which he gives of the surgical instruments used by the ancients in operations on the head are very interesting, and serve to illustrate the descriptions of Paulus and other earlier surgical writers.

In fractures of the clavicle, Albucasis enjoins the surgeon, when there are any projecting spiculæ, to make an incision and cut them out ; after which, if the wound is large, unite it with sutures. A compress moistened with rose-oil, vinegar, and wine, is to be applied to allay inflammation. He understood the value of postural treatment in this fracture, and hence directs the patient to sleep on his back with a pillow under his arm-pit.

In cases of comminuted fracture of the ribs, our author advises making an incision and removing any pieces of bone which may irritate the pleura. He gives a drawing of the *meningophylax*, or instrument for protecting membranes during the sawing of bones.

In the treatment of fractures of the arm, Albucasis directs us to make the bandages of soft thin linen cloth ; but of broader and firmer linen, if the thigh or leg is to be treated. Below them is to be applied a smooth cloth spread with a liniment. After the under bandages have been put on in the manner already described (which is the same as that of Paulus), the splints are to be applied, provided no swelling nor inflammation be present, for in that case they are to be deferred for a few days. These splints are to be constructed from the middle part of the alcanna, or of pine, or of the palm-tree, or of a tree which he calls *calingi*.

Avicenna directs us to form the splints of the wood of alcanna, or of oleander, or of pomegranate tree, or the like.

In the treatment of fractures of the ulna, and radius Albucasis is very lucid and accurate. He calls the ulna the larger of the bones. He directs the arms to be suspended

with the thumb uppermost. When fragments of bone are likely to occasion irritation, he advises making an incision and removing them. When the arm is affected by severe pruritus, he tells us to remove the dressings and bathe it with hot water.

The best interpretation of the language of Albucasis in describing the process of treating fracture of the thigh bone, is that he applied splints which extended the entire length of the limb. He says the surgeon must stuff up all the hollow places in the limb with soft pads before applying the splints. Also, that a bandage be applied from the heel to the nates. Rhazes is the only one among the ancients who directs the thigh to be placed in a bent position, with suitable supports beneath, in other words, the double-inclined plane.

When a redundant callus is formed as a result of union in fractures, if recent, Albucasis directs us to use astringents, such as aloes, olibanum, and myrrh, with wine and vinegar. He also speaks of applying a plate of lead to promote absorption by its pressure. When the callus is hard, he would have it scraped or sawed off.

In complete dislocation of the lower jaw Albucasis directs its reduction by introducing the thumbs into the mouth, and grasping the jaw in the manner described by Hippocrates.

Albucasis, as well as Rhazes, Avicenna, and Haly Abbas, believed that dislocations occur more frequently at the acromial than at the sternal end of the clavicle. Sir Astley Cooper and Mr. Liston confirm this ancient opinion, in opposition to Desault and Boyer.

Albucasis describes four varieties of dislocation of the hip, and the methods of reduction. The latter are; First, by rotating the limb in all directions. (This would seem to imply reduction entirely by manipulation). Second, by

making extension and counter-extension, with the aid of two assistants. Third, by suspending the patient, and getting a strong assistant to grasp the affected leg, and swing himself by it. Fourth, by making extension with ropes fastened to two sticks or pieces of wood as in dislocation of the spine. When the dislocation is forwards, the surgeon is to press down the prominent part with his hands; but if backwards, a board is to be used as described by Paulus.

According to Albucasis, dislocation at the ankle can only take place inwards or outwards. When the tarsal bones are displaced, he directs us to restore them by making the patient put his foot upon the ground; and the surgeon by placing his foot upon it and standing erect is to push them into their place. After their reduction a splint is to be put under the sole, and secured with bandages.

This author has also treated of all the other varieties of fractures and luxations of the bones, but as no additional observations are to be found in his works, which are at all original, but merely such as are contained in the writings of still earlier surgeons, I will not repeat further what he has said upon the subject. In all cases he exhorts the surgeon to act with caution but confidently, assuring him that such conduct will prove most pleasing in the sight of his Creator, and redound to his own glory.

The works of Albucasis were held in very high estimation by the early modern writers on surgery, as we find him extensively quoted by Guy de Cauliac, Theodoricus, Brunus, Gulielmus de Saliceto, and others, down even to the time of Fabricius of Aquapendente.

The works of Albucasis and Alsaharavius, if we are to consider them as one and the same author, have been printed and published, either complete or in part, in five and twenty editions. The earliest was at Venice in 1471, the latest at Oxford, England, in 1778. They have not

always been published separately. They have been published with Mesue, Horatianus, with Roland and Roger, and Constantine the African.

I have a fine folio copy with the following title: *Libri theoricæ necnon practice Alsaharavii, qui vulgo Acararius dicitur, Impensis Sigismundi Grim Medici, & Marci Vuirsung Auguste Vindelicorum. Anno virginæ partus. MD.XIX. Die vigesima quarta Martii.* It contains one hundred and fifty-nine folios (equals 320 pages), and five index leaves, double columns, marginal references, no catch-words, two large and very curious initial letters. I also have an old copy of a folio edition printed in Arabic; but being unable to decipher Arabic, I cannot say where or when it was published. It formerly belonged to Atkinson, the quaint old biographer, and contains his book-plate. The Oxford edition, two volumes, quarto, 1778, in Arabic and Latin, with figures of the surgical instruments, is considered the best. The figures are also to be found in some of the earlier editions, viz.: Venice, 1500, and Basil, 1541.

Liber Servitoris de Præparatione Simplicium Bulchasi Benaberazerin translatus à Simone Januensi, interprete Abram Judæo Tortuosiensi Lib. xxviii. Venet. 4°, 1471; ibid fol. 1479; fol. 1483; fol. 1484; fol. 1490; fol. 1495; fol. 1497; fol. 1502; fol. 1527; fol. 1538; fol. 1558; fol. 1561; fol. 1602.

Albucasæ chirurgi methodus medendi Lib. III. Venet. fol. 1500; ibid fol. 1506; fol. 1520; fol. 1530; fol. 1531; Argent. fol. 1532; Basil. fol. 1541; Oxonii, 4°, 1778. The titles vary somewhat in the different editions.

Alzaharavii compendium artis medicæ. Aug. Vind. fol. 1490; fol. 1530.

Libri theoricæ necnon practicæ Alzaharavii, qui vulgò Alzararius dicitur. Aug. Vind. fol. 1519. Roma fol. 1519.

NEW YORK SURGICAL SOCIETY.

SUTURING OF THE DIVIDED ENDS OF EXTENSOR TENDONS IN THE FOREARM.¹

DR. F. LANGE presented a lady patient who, about two months ago, fell from a considerable height, and struck against a china umbrella stand, and cut the tendons of the extensor muscles on the left forearm. He saw the patient two weeks afterward, when the wound was almost healed, and there was extensor paralysis involving the third and fourth fingers, only the last two joints moving through the action of the interossei. About four weeks ago he made a longitudinal incision, and found that three of the extensor tendons had been divided, namely—those belonging to the third and fourth fingers, and to the index finger. The extensor indicis proprius was not injured, because the action of the index existed. The divided tendons of the extensors were separated to a distance of almost one inch and a half. They were brought together and sutured with antiseptic silk. The hand was then put in a position of hyperextension, and an antiseptic dressing applied. The sutures were removed at the end of one week. The result was that the movements of the fingers could already be quite satisfactorily performed, and it was probable that improvement would continue to increase.

STRANGULATED HERNIA.

Dr. Gerster presented a specimen, and related the history of the case as follows :

A working man, thirty-five years old, had had a reducible oblique inguinal hernia since his eleventh year, and had worn a truss for seventeen years. On the evening of January 30, a sudden abdominal pain compelled him to leave work, whereupon he, of his own accord, took a large dose of salts and went to bed. Vomiting and more pain supervening, the family attendant was sent for, who made an unsuccessful attempt at taxis. Local vomiting, intense local pain with tenderness all over the belly, induced Dr. Gerster to have the patient transferred to the German Hospital, where herni-

¹ Stated Meeting, March 13, 1883.

otomy was practiced January 31, eighteen hours after the beginning of the incarceration, ether being the anæsthetic used. The very large, tense and somewhat reddened tumor was incised in its full length down to the sac; this being opened, some reddish serum escaped and a large omental mass presented itself, which was found to be firmly attached to the lowest portion of the sac. Both pedicles having been secured by catgut ligatures, the mass was removed, exposing about ten inches of small, much distended, dark-red intestine. The strangulation now was relieved by the usual steps, the strangulated portions of the gut were carefully drawn forth and examined. The knuckle of intestine showed no unequivocal signs of necrosis, was uniformly reddish brown, not mottled or gray; its feel and turgor were normal, both at the convexity and at the places of strangulation, the serosa shining so that it was deemed proper to replace it in the abdominal cavity. The sac being closed at its neck by a strong, purse-string-like, catgut suture including the external ring, was cut away below this suture and entirely extirpated. The operation was finished by the application of a row of external sutures and an antiseptic dressing. Immediately after the operation marked relief was felt, nourishment was retained, wind passed, and vomiting ceased. Five hours later the thermometer showed 103° F., but the pulse was good, and the patient felt well. Next day some meteorism, slight nausea, and a temperature of $103\frac{1}{2}^{\circ}$ F. were noted, wherefore one grain of opium hourly and an icebag on the belly were ordered. On the third day after the operation nausea and meteorism had increased, and the patient's skin and sclerotic had attained a marked icteric hue. Temperature ranged between 102 and 103° , the pulse between 110 and 120 beats. The patient complained of pain in the hypogastrium, which, however, did not increase on pressure. The wound was found well united and without a trace of reaction, so that some of the absorbed catgut sutures could be wiped away. The night was passed badly in spite of large quantities of opium. On February 4th it was reported that the patient, having vomited last night, had a violent coughing spell, when he felt as though something had given way, but not feeling any increase of pain, did not call the nurse. Next morning a knuckle of injected gut was found protruding from the open external wound. It had become firmly adherent to the walls of the wound by exuded lymph; and,

in view of the meteorism, vomiting, high fever, and generally bad condition of the patient, it was decided not to disturb the protruding gut, but rather to make an attempt at utilizing the state of affairs. The finger was carefully introduced into the inguinal canal, and it was ascertained that no strangulation was present, whereupon a long incision was made into the gut, and, some gas having escaped, a soft catheter was pushed well up into the upper part of the intestine, this portion having manifested itself by the escape of fæcal matter; thus it was hoped that more gas might escape. The patient died the same day at 3 P. M., with all the signs of a most acute septicæmia. It was noted that as the rate of the pulse rose the temperature declined, till shortly before death it was 99° F.; pulse filiform, and not to be counted.

Post-mortem examination revealed the absence of septic peritonitis. A small quantity of orange-colored, clear serum escaped from the cavity. The prolapsed gut lying in the wound belonged to the lower part of the ileum, and showed signs of adhesive peritonitis. In the left iliac fossa a mass of agglutinated, slate-colored intestine was found, representing the hernial contents replaced at the operation. The places of strangulation were still clearly visible by a band-like depression at one end, and by a loss of continuity of the serosa at the other end of the knuckle. Here the tissues were not necrosed, whereas at the convexity of the knuckle, where at the operation normal turgor and feel were present, an extensive portion of the gut was necrosed and shrivelled, but not detached. The intestine having been opened, a band-like coat of diphtheritic grayish-white membrane was found closely adherent to the mucous surface corresponding exactly with the sites of strangulation. The mucous space inclosed by these two lines was covered throughout by a multitude of round and confluent diphtheritic patches, some of which being denuded of their gray coating presented themselves as shallow ulcers. These ulcers appeared to be the same, both over the necrosed and the non-necrosed portions. The mesentery was found turgid and reddened, but not necrosed. The cause of death was acute septicæmia from enteric diphtheria and necrosis, caused by a strangulation of eighteen hours' duration, and probably favored by the action of the laxative taken. Here we had then a case of very acute strangulation, where at the operation for its relief the gut was found to be without signs of imminent necrosis, fairly turgid-

cent, and where some five or six hours after the operation that portion of the intestine necrosed which had not been subjected to the direct pressure of the strangulating ring. Clearly, changes in the arterial blood supply from the mesentery must have been the cause of this issue, and not direct pressure, as is most frequently the case. This is the second case of a similar nature occurring in the experience of Dr. Gerster, and he pointed at the inefficiency of our knowledge in determining, at the time of herniotomy, whether the given intestine will, or will not undergo necrosis after replacement. He called attention to the fact that the external appearance of the hernial contents in many cases presented no reliable signs for determining the future of such an intestine, and that the surgeon still had to trust to good luck. A narrowing down of the limits of this class of cases was very desirable.

THE QUESTION OF TREPHINING IN INJURIES OF THE HEAD.¹

A paper on this subject was read by Dr. H. B. Sands, for which see pages 99-118.

In reply to Dr. Sands request for an expression of opinion by the society as to the rarer methods of treatment, Dr. L. A. Stimson narrated two cases, one of compound fracture without trephining, and one of simple fracture with trephining. The first case he saw in Bellevue Hospital. A young man came on foot one morning, having received a blow upon the back of the head a little to one side of the median line, inflicted by a chisel. The wound was a linear one, the bone was penetrated, and one edge of the cut portion of the skull turned outwards. There were no head symptoms. The man remained in the hospital for a week or ten days without symptoms. Suddenly, without any warning, severe cerebral symptoms developed, and the case terminated fatally within a few hours. At the autopsy there was found an incised wound in the soft parts, and in the bone, with very slight splintering of the inner table. The dura mater was not injured. There was an abscess about the size of a hickory-nut in the substance of the brain separated from the dura mater by a layer of healthy brain tissue. There was a small amount of pus and serum between the dura and the bone at the point of fracture. Death was apparently the result

¹ Stated Meeting, March 27, 1883.

of the inflammatory processes in the wound and of its insufficient drainage.

The second case was one of simple fracture treated by trephining. A young man fell from a truck, and was removed to the Presbyterian Hospital in a comatose condition. Dr. Stimson saw him twenty-four hours after the receipt of the injury. The patient was still comatose, there was no wound of the scalp, and only a slight puffness on the left side of the head, which the house surgeon said was not present when the patient was admitted to the hospital. There was slight weakening of the left forearm. There were no other symptoms. On the third day after the injury he received word that the patient had had several violent general convulsions, and, on visiting the hospital, he found him comatose, with high fever and considerable agitation, and with very decided paralysis of the extensors of the left forearm. Dr. Stimson made an incision upon the right side of the head along the motor area, and found a long linear fracture running from behind forward parallel to and about three inches from the median line, with slight separation, but no depression of bone. He applied a small trephine at the site of the fracture, removed a button of bone, and found a thin layer of clotted blood between it and the dura. He enlarged the opening in the bone posteriorly and the dura bulged into it, but was without pulsation. He then applied the trephine a second time about one inch anteriorly to the spot where the first opening was made, removed a button of bone, and found a clot as before, and the dura also bulged. He then introduced the needle of an hypodermic syringe, and withdrew a small amount of fluid blood, after which he nicked the dura and evacuated about a drachm of blood, which may have come, however, from a vein wounded by the needle. The patient had no more convulsions. Toward the end of the operation he seemed to be more sensitive to the handling of the wound than at first. Afterwards he developed complete facial paralysis on the right side and died on the following day. No autopsy was allowed.

While he did not think that the soft parts should be divided in cases of simple fracture, or the bone trephined without positive indications, still he did not think that this operation is a grave one if the dura is left uninjured. It seemed to him that interference in each case must be decided

by a comparison of the possible benefits with the risks of the operation. In illustration of interference based on such comparison, he mentioned a case as follows: A woman had been insane for nearly two months after falling out of a second-story window and receiving a scalp wound behind the motor region on the right side of the head. He trephined and explored for cerebral abscess. The dura was not opened. No evidence of abscess was obtained. The patient recovered from the operation and also from her insanity within a fortnight. As in this case the grave mental disability seemed to justify the operation, even in the absence of probable symptoms of abscess, so in another grave case cerebral symptoms might make it proper to change a simple fracture into a compound one, in order to remove a depressed fragment or a clot.

Dr. J. L. Little referred to a case which came under his observation a few years ago at St. Vincent's Hospital. The patient fell from a height and received a slight scalp wound, which exposed the left side of the frontal bone about one inch above the angle of the eye. Exploration showed simply bare bone without any evidence of fracture. The patient's symptoms were those of insanity, and she became so violent that, at the end of six weeks, it was arranged to have her removed to an Insane Asylum. Before leaving the hospital, Dr. Little trephined, and removed two buttons of bone, and also the bridge of bone which connected the two openings, but found nothing wrong. The inner table of the skull was perfectly normal. In less than twenty-four hours there was marked improvement in the symptoms, and within two weeks after the operation the patient left the hospital perfectly sane.

Dr. Little further referred to a case which he saw a few years ago, in consultation with Dr. Van Wyck. The patient was a child about seven years of age, who had received a compound fracture of the right parietal bone. There being no symptoms of injury of the brain, no operation was performed. About four weeks after, when Dr. Little saw it first, the child was suffering from symptoms of compression, paralysis, dilation of the pupil, coma and convulsions, and had had several rigors. Her wound was granulating. Dr. Little enlarged the wound, and removed several loose pieces of bone. There was no marked depression of the fragments, the symptoms of compression evidently not depending upon

depressed bone. Dr. Little ventured to puncture the dura, but finding nothing, with a delicate bistoury he then punctured the brain substance and found an abscess some distance below the surface. From a drachm to a drachm and a half of pus made its escape. The symptoms of compression rapidly disappeared. A fungus cerebri took place, which was treated by the application of dry-absorbing powders and moderate compression. The child made a good recovery.

Dr. Post referred to an autopsy in the case of a little girl, at which was found a depressed fracture of the skull, moderate in amount, that had not been attended with marked symptoms in the beginning. But after the lapse of several weeks, symptoms of encephalitis had come on, and had led to a fatal result. An abscess was found in the lower part of the frontal lobe on the side corresponding with the injury, and in the immediate vicinity of the depressed bone.

Dr. Sands remarked that he did not wish to be understood as being opposed to trephining in every case of simple depressed fracture. He merely wished to say that, as such fractures are usually the result of a force applied over a considerable area, the lesions were liable to be extensive, and of such a character as to render trephining a useless operation; consequently he would hesitate before converting a simple into a compound fracture. But if he believed that the fracture was limited in extent, and that mischief might be directly caused by a fragment of bone pressing upon the dura, he would not hesitate to trephine. He thought, however, that such cases were extremely rare.

The President, Dr. Markoe, said that his own experience accorded nearly with that of Dr. Sands. He thought it was, as a rule, disastrous to add to an already-existing fracture the complication of an external opening. In one or two instances where he had felt the depression was abrupt and very marked, and that the symptoms were due to the depression, he had made an incision, and proceeded to elevate the bone; but the cases of abrupt depressed fracture without breaking of the skin are very rare. In only one or two instances had he ventured to trephine, and was not able to give the results. He believed that the true principle was that which Dr. Sands had announced.

EDITORIAL DEPARTMENT.

TWELFTH CONGRESS OF GERMAN SURGEONS.¹

The twelfth Congress of German Surgeons convened in April last under the presidency of the venerable von Langenbeck, and, as will be seen from the following brief epitomé of their labors, showed no falling off, either in attendance or papers of interest.

ALKALOIDS OF DECOMPOSITION.

Maas (Wurzburg) has been pursuing studies on this topic, following those made by Thiersch, Bergmann, Brieger, and others. After treating masses of decomposing flesh with ether, chloroform and amylic alcohol, he isolated three different vegetable alkaloids; these, when injected into living animals, showed the following effects: the first caused tetanic spasm, the second acted like morphine, and the third like strychnine. The possibility of a form of septicæmia from absorption of these alkaloids generated during an unhealthy wound process was alluded to in the discussion.

THE MICROCOCCI OF ERYSIPELAS

Were demonstrated by Fehleisen (of Bergmann's Berlin clinic). A patient had been inoculated forty-five hours previously, and when showed displayed a typical erysipelas. The micrococci which had been here implanted were the product of more than thirty generations cultivated on gelatine, and could be considered entirely free from extraneous matter or germs. Of eight thus inoculated, only one failed to show typical results. The last trial in April was just as successful as the first during the previous August, and with the same culture. The one person on whom the experiment failed had suffered from an idiopathic attack but a short time before.

TREATMENT OF WOUNDS BY SUBNITRATE OF BISMUTH.

Riedel (Aix) reported the results of his trials of Kocher's new method of treating wounds, which were, for the most

¹ From Beilage zum *Centralblatt für Chirurgie*, No. 23, 1883.

part, favorable, though he thought bismuth had no virtues as against erysipelas, but rather the contrary, since eight patients out of sixty-one suffered from it. After combining sublimate with it, he had no further trouble. In the discussion Kocher said that, so far as he had studied the subject, the bismuth did not directly affect the micrococci—of erysipelas, for instance—but rendered their usual nourishment unfit for their support, by forming a bismuth albuminate in which they could not grow. Kocher also stated that he had observed both nephritis and enteritis as a result of bismuth poisoning.

MYOSITIS OSSIFICANS.

Kümmell (Hamburg) presented a case of this rare malady—a boy of twelve, whose parents were healthy. The trouble had gradually developed since he was a month old. With the exception of the muscles of deglutition and a few of the muscles of the thorax and abdomen, the musculature of the entire body was pretty thoroughly involved. There was, moreover, a tendency to the formation of exostoses from various parts of the skeleton. Some four other cases, in most respects similar, were alluded to in the discussion of Kümmell's paper.

LIGATURE OF THE COMMON ILIAC.

Kümmell also reported a ligation of the common iliac made necessary by secondary hæmorrhage four days after extirpation of a bubo. The external iliac was first tied, and ten days later the common trunk. Gangrene followed this latter procedure, and necessitated amputation at the hip. The patient finally recovered. He had found statistics of fifty-five cases of ligation of the common iliac, mostly by English and American surgeons; of the three reported from German sources all died. Altogether, forty-one were fatal, through gangrene, collapse or septic processes.

SARCOMA OF THE SCIATIC NERVE.

Bardeleben (Berlin) showed two patients from whom he had removed large sarcomatous tumors involving nearly the whole length of the sciatic nerves.

UNDUE PROMINENCE OF THE INTERMAXILLARY BONE IN CASES OF HARE LIP.

Roser (Marburg) discussed what was to be done in those cases of congenital defect where the intermaxillary bone projected far beyond its proper position. He had practiced

Blandin's method ; but experience had shown that the reduction to its place by section of the vomer was only applicable in rare cases, so that he had usually felt compelled to remove the bone entirely. He especially asked the others to state their results. Langenbeck thought that, while forcible replacement was at times possible, it was still necessary to resect occasionally, though the results were not always happy. He would retain the bone whenever it was possible. Bardeleben remarked that his own experience covered a very large number of cases. He believed in resecting a piece of the vomer—or, better, a simple section of the vomer from below upward, and then forcing the projecting bone backward, so that the anterior portion of the vomer glides back along side the posterior portion ; and thus the bad position of the intermaxilla is rectified. Especial care should be taken to make the above section subperiosteally and without injury to the arteries ; guarding against both secondary hæmorrhage and necrosis. The latter was the special danger in Blandin's operation. He had seen but three cases where the bone at fault was too large, and the fissure too small to allow of this method of replacement.

EXTIRPATION OF GOITROUS THYROID GLANDS.

Several papers were read on this subject, which seems to have been quite popular.

Kocher (Berne) stated that up to 1883 the operation had been done two hundred and forty times, with a mortality of eleven per cent. He himself had operated on one hundred and one cases, with a mortality rate in malignant cases of twenty-five per cent., in non-malignant cases of 5.1 per cent. In his cases the deaths were owing, not to the operation directly, but to complications of paralysis of the larynx, pyæmia, etc., though of his last series of forty-three cases not a single patient died of hæmorrhage or sepsis. He considers the technique of the operation as well established, that it is possible to prevent serious bleeding as well as injury to the recurrent nerves. All ligature *en masse* should be omitted, and the vessels should be carefully isolated and then cut between two ligatures. The special features of the vascular supply are not as uncertain as has been generally supposed. Tracheotomy should not be performed unless especially indicated ; largely because it interferes with strict aseptic precautions.

Bardeleben agreed with Kocher, particularly in regard to

the non-performance of tracheotomy. Berlin afforded very few cases of goitre, but he reported three cases upon which he had operated.

Wölfler (Vienna) based his paper upon a series of sixty-eight extirpations made by Billroth with a mortality of 7.3 per cent. After these operations tetanus was seven times observed, beginning within eight days, and proving fatal in three cases. Only females were thus attacked.

PERMANENT TAMPONADE OF THE TRACHEA

Was discussed both by Michael (Hamburg) and Schoenborn (Königsberg). The former alluded to some sixteen cases in which it had been used; five times with sponge, and nine times with sacs filled with water or glycerine. In one case this packing around the tracheal canula had been borne for fifteen months; the patient had cancer of the upper respiratory passage, but on section, no metastatic deposits were found in the lungs. On the other hand, Schoenborn reported a case in which the pressure of the tampon caused ulceration and gangrene of the trachea.

WOUND OF THE THORACIC DUCT.

Boegehold (Berlin) reported a case in which he had helped his chief, Wilms, at an operation for a large cancerous tumor of the left supra-clavicular region. During the operation, he had to dissect down towards the junction of the jugular and subclavian veins. While scraping out the diseased tissue with a sharp spoon, he was astonished at a stream of milky fluid as large as a small straw being poured out over the operation field. It was checked by a tampon of salicylic cotton, after which the wound healed without reaction, while the general condition of the patient seemed in no way disturbed, and he lived for six months. No autopsy could be secured. There was not the slightest doubt as to the injury.

The extreme rarity of this accident led Boegehold to study its literature. He was able to find but one authentic case, related by Bonet in his work on practical anatomy published in 1700. The patient was wounded in the breast by a bullet, and for several months a milky fluid escaped in considerable quantity from the bullet wound, while death finally was caused by inanition and paralysis.

THE TREATMENT OF CANCER OF THE BREAST.

This subject, treated of by Küster (Berlin), elicited considerable discussion. His paper was mainly based on the great advisability of thoroughly cleaning out the axilla.

In this matter all the others heartily agreed with him, while Gussenbauer would go still further, for he believed in extirpating any enlarged supra-clavicular glands. Langenbeck thought that, when the glands above the clavicle were involved, the case had progressed too far to make operation justifiable. Esmarch had gone further yet, for in one case where he found the brachial plexus and vessels involved, he allowed the patient to recover sufficient consciousness to assent to amputation; he then anæsthetized her again, and disarticulated at the shoulder, with happy result. Bergmann and Winiwarter were in perfect accord with Küster.

BALL OF HAIR IN THE STOMACH.

Schoenborn (Königsberg) exhibited a specimen removed from the stomach of a girl who had suffered for two years. A tumor of the size of a fist could be felt in the gastric region, the same being painful on pressure. The diagnosis as between a tumor of the spleen or of the omentum was uncertain. Upon operation, it was found to lie in the stomach, whence it was removed. Incision of the tumor showed it to consist of short hairs matted together. It afterward transpired that this girl, with a number of her schoolmates, "*in order to gain a clear voice,*" was in the habit of biting off her hair and swallowing the ends thus bitten off. The case is not unique. Seven similar cases are recorded, one of which was complicated by a second similar mass in the intestine; but all the others ended fatally—one from hæmorrhage from the stomach, the others from peritonitis, or incurable vomiting. Some of these patients had swallowed the hairs in their full length.

RESECTION OF THE PYLORUS.

Mikulicz (Krakau) reported a successful case of this kind, the patient having cancer. He also referred to the appearances of these cases as seen through the gastroscope (*vide* description of this instrument in the ANNALS OF ANATOMY AND SURGERY, March, 1883, p. 138). While the normal pylorus, as seen through the instrument, is thrown up into a three-cornered or oval fold, and is in constant motion, this picture is lacking when it is involved in cancerous degeneration. Then

one sees in that region walls which move but slightly, and in which folds are lacking; and in some cases the color of the mucous membrane is altered, being either more anæmic or else much darkened.

In the discussion, Gutsch (Carlsruhe) referred to two cases of resection of the pylorus made by Molitor according to Billroth's and Rydygier's methods. The first lived a year, to die from a recurrence; the other died on the third day from septic peritonitis caused by gangrene of the horizontal colon.

GASTRO-ENTEROSTOMY.

Wölfler considered this operation to be indicated when resection of the pylorus was impracticable, on account of extensive adhesions. In case of cancer it might lead to temporary improvement, in case of cicatricial stenosis to permanent recovery.

Wölfler also demonstrated specimens of resection of portions of the intestine made by Billroth; one was of small intestine 113 centimetres long, the other consisted of a considerable length of large intestine. He alluded to the fact that resection of the colon is most favorable when the movable portions are concerned—*e. g.*, the transverse portion and the flexures—whereas those portions where adhesions are firmest, for instance, to the renal surfaces, as happens along the ascending and descending portions, tolerate interference much worse. The experiences of various German surgeons confirm this.

During the discussion Lauenstein (Hamburg) reported a case of cancer of the pylorus where he found resection impracticable on account of adhesions, and therefore made a gastro-enterostomy with good success. Hahn (Berlin) had made an operation, in a similar case, much like that devised and practiced by Loreta for cicatricial stenosis; he made an opening and dilated the pylorus. Riedel (Aix) had made a resection of a loop of intestine four days after reposition of hernia. The gut had become so twisted and obstructed by inflammation that the operation was made imperative. Rapid recovery.

STATISTICS AND OPERATIVE TREATMENT OF CANCER OF THE RECTUM.

Heuck (Heidelberg) reported forty-three cases of this nature in Czerny's clinic since 1877; twenty-nine of them in

patients of ages from forty to sixty. Thirty of them were in males. Forty-two of them were cancers involving the whole circumference of the mucous membrane or almost the whole; one was an epithelial growth about the anus. The exact microscopical structure could not be found to bear any definite relation to the clinical features of the cases. The inguinal glands were not earlier affected than those nearer the rectum, as Winiwarter had claimed;—only so when the tumor involved first the anus. Twenty-five of the cases were operated on according to Volkmann's method; of these one died from the operation. Eleven of them are still living, nine without any rectum. Nothing of the anal border or of the mucous membrane should be allowed to remain, because these fragments are first to show signs of recurrence;—this at least was Czerny's experience.

THE TREATMENT OF SYPHILITIC ULCERS OF THE RECTUM.

Hahn (Berlin) regarded it as doubtful whether the so-called syphilitic ulcers of the rectum were peculiarly syphilitic. Up to the present time gummy deposits were found in connection with but very few of these cases, and condylomata were very rare. Concerning their treatment, he recommended colotomy in those cases where, in spite of most careful local measures, no improvement was manifest, and where patients wasted away on account of the great and constant suppuration. He had made the operation in eight such cases, and in several of them with brilliant results.

Küster had resorted to this measure in one case and had practiced frequent irrigation from the artificial opening through the anus. This patient recovered from the ulceration, but succumbed to an effort to close the lumbar opening. Es-march suggested making a "sphincterotomy."

EXTIRPATION OF THE GALL-BLADDER.

Langenbeck (Berlin) had made this operation three times, on account of trouble set up by calculi. He showed his third case to the Congress—a female patient thirty-four years of age. She had suffered to such an extent that she had been compelled to give up work. Recovery was prompt, and the woman is now about her work as usual. He recommended the operation in such cases not so much because the gall-bladder contained a mass of concretions, but because it *gave rise to them*—i. e., originated the trouble.

CYST OF THE PANCREAS—OPERATION.

Gussenbauer (Prague) reported the following case: A healthy man, who had eaten a very hearty meal, began to suffer from a severe gastric cartarrh; shortly after this he noticed a tumor, which slowly developed in the epigastic region. After eight weeks he was admitted to the hospital, and there Gussenbauer was able to outline a fluctuating tumor, evidently behind the stomach and retro-peritoneal, and probably of a cystic nature. All the usual inflammatory symptoms of abscess were wanting. At the operation, the abdomen was opened in the middle line, the stomach separated from the colon, the peritoneum carefully stitched to the solid cyst wall with silk, and the cyst then opened. Some 1900 ccm. (about sixty ounces) of fluid were evacuated; microscopical and chemical investigation showed this to consist of altered blood. Examination of the cavity showed it to be retro-peritoneal and lined with soft excrescences. After washing it out, the abdomen was antiseptically dressed. The region of the wound soon became covered by an eczematous eruption; whereupon the discharges were chemically examined, and found to give a strong alkaline reaction, and to change starch into sugar. It was, therefore, evident that the tumor was a cyst of the pancreas. Recovery was perfect.

Kulenkampff (Bremen) related an experience of his own quite similar, except that the trouble developed after an injury. His patient also recovered.

FORMATION OF A NEW CAPUT FEMORIS AFTER RESECTION.

Küster and Israel both demonstrated cases of this nature, the latter's specimen being quite perfect.

Aside from the papers thus summarized, a number of others of lesser interest were read, of which we make no special mention. A few pathological specimens and a number of new instruments were also displayed. For further notice of these we must refer our readers to the original.

ROSWELL PARK.

THE WEAK POINTS IN A LISTER DRESSING AND THE ADVANTAGES OF CORROSIVE SUBLIMATE AS AN ANTISEPTIC.¹

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IT must be admitted by the most devoted of the advocates of Listerism that the dressings applied with the strictest attention to all the details of this system not infrequently fail in controlling the progress of putrefaction. This is the case not only in a severely lacerated wound, but also at times in a comparatively simple one. It is difficult in all cases to explain why this should be so; in some no doubt some error in the technique may have been committed by the surgeon himself; in certain other cases it must be assumed either that the antiseptic itself—*i. e.*, the carbolic acid—is at fault, or has been wrongly applied, or that the dressings themselves are imperfect in construction. In connection with these two points considerable vagueness has been encountered. According to Mr. Lister, who started with a solution of 1 part of the acid to 100 parts of water, the solutions to be employed now are: for the instruments, hands, etc., 1 part to 20; for the spray, 1-30; and for the sponges, etc., 1-40. Why should such diversity exist? What strength, in other words, is necessary to arrest or destroy bacteric life in a wound?

¹ Read before the New York Surgical Society, April 10, 1883.

Clinical experience has generally settled on the range of strength given by Lister—to wit, two and a half to five per cent. of the acid. But the application of laboratory tests does not apparently accord with this conclusion. For instance, in an article by De La Croix,¹ it is stated that ten per cent. of carbolic acid is required to destroy bacteric life, and in the very careful and much to be admired investigations of Koch (p. 242) it is likewise recorded that ten per cent. solutions of carbolic acid are necessary for safe or sure disinfection, and that the anthrax spores are destroyed in a four per cent. solution only after three days, and in a five per cent. solution, only after two days immersion. These statements have been widely quoted, and have much embarrassed observers by their variance with clinical work. But on reference to the articles themselves and particularly to that of Koch, "On Disinfection," published in the Reports of the Imperial Board of Health for 1881,² there will be found a reason for the discrepancy. It consists in this, that the experiments have purposely been conducted upon the *spores* of the anthrax bacillus as being the most resistant to disinfectants of all such micro-organisms. These spores are much more difficult to affect than the bacilli themselves. To show the influence of weaker solutions upon the bacilli themselves, a number of tests were applied by Koch, by soaking silk thread in the juice expressed from the spleen of a mouse affected with anthrax bacilli, and then wetting them with one, two, three and five per cent. solutions of carbolic acid for periods varying from two, five, ten, fifteen to twenty-five minutes. After these had been placed in a gelatine culture glass, no signs of development occurred, showing that all life had been arrested. In the control preparations, however, of

¹ *Archiv. f. experimen. Pathologie. Bd. xiii., Heft. 3 and 4, 1881.*

² *Mittheilungen aus dem Kaiserlichen Gesundheitsamte, Berlin, 1881.*

similar impregnated threads which had not been dipped in the carbolic solutions, there were to be found in the gelatine culture glasses marked development of bacilli, and even of spores. Again, a one per cent. solution of carbolic acid with an equal quantity of anthrax blood injected into a second animal, proved innocuous, but a one-half per cent. solution failed to neutralize the poisonous blood. Similar observations were carried on in respect to less obdurate micro-organisms, including the micrococci found in septicæmia, and from a large experience gathered in this manner, Koch formulates the statement, that carbolic acid in one to five per cent. watery solutions is a good disinfectant for those organisms which have not passed into the *dauer* form, or the condition of spore growth, and that 1 part of the acid to 400 of water—*i. e.*, one-quarter per cent.—must be permanently present to control life in the bacteria met with in wounds. Note carefully here the use of the words “permanently present,” and it must also be remembered that to produce this condition stronger solutions are of necessity to be employed.

More recently these experiments have been repeated with a corresponding result by Dr. Sternberg,¹ of the United States Army, who has found by the test of flask culture in reference to carbolic acid, that a 0.2 per cent. solution of this acid would so act upon septic micrococci as to prevent development, but that a stronger solution was required for the micrococcus of ordinary pus. This observer reiterating the remarks of Koch that the resisting power of reproductive spores is far greater than that of bacterial organisms in active growth (multiplying by fission), says that the quantity of carbolic acid to be used as a germicide should not be less than five

¹ Experiments to determine the germicide value of certain therapeutic agents. G. M. Sternberg. American Journal of Medical Sciences, April, 1883.

per cent., for it is necessary, he wisely states, to keep on the safe side since we do not know whether all of the pathogenic bacteria form spores or otherwise.

These considerations, which might be extended by detailing more at length the steps of the various experiments, or by quotations from other observers, are sufficient to explain the satisfactory results that follow the present use of carbolic acid in the treatment of wounds, and to show us that the antiseptic has in the main hitherto been rightly used.

In looking further for the causes of error, some may perhaps be found in the imperfection of the dressings. Tests of the strength of the gauze employed revealed to me in January, 1880, that the strength of this part of the dressing varied much with its age. Gauze impregnated after Lister's formula, and kept in a tight box wrapped up in rubber cloth, and originally of a five per cent. strength, gave at the end of three months 1.44 per cent. of carbolic acid, and another specimen, similarly prepared and preserved, showed at the end of three weeks 1.82 per cent. These observations have been confirmed by Kopff, who found on the second day after gauze had been impregnated, according to Lister's and Bruns' methods, that the former contained 2.61 per cent., and the latter 5.62 per cent. In the gauze sold in the shops only 0.5 per cent. of carbolic acid was found. The gauze when used, therefore, should be freshly prepared, for which purpose Bruns' formula is the best. (Resin, 400 gr. carbolic acid, 100 gr. castor oil, 80 gr. alcohol, 2 litres).

Another possible cause of failure in an antiseptic dressing is encountered in the catgut ligature. Made, as it is, from the intestines of sheep, it is not to be wondered at that the possibility of infection thereby should have been considered. Few, however, have been the facts that confirm such a

suspicion. Koch calls attention to this, and De Santi¹ more recently repeats this caution, and quotes Zweifel of Erlangen, who accused the catgut as being a cause of infection in wounds. Kocher, of Berne, also furnishes a case where apparently the septicæmia was due to this cause, and Volkmann reports two cases of malignant pustule from the inoculation by means of anthracised catgut.² In investigating this point, Koch has proven by careful experiment that solutions of carbolic acid in oil or alcohol are absolutely inert in respect to their action on bacteric life, either on the spores or bacilli. He took solutions of one and five per cent. carbolic acid in oil, also pure oil itself, and tested them with the anthrax bacilli and other micro-organisms, and proved that bacteric life was arrested in the pure oil at the end of six days; the same took place in each of the carbolized solutions. The same, moreover, occurred in the experiments, when the bacilli were exposed to the air on gelatine. In other words, no influence was exerted by carbolic acid when mixed with oil. The bacilli lived as long in oil and oily solutions as in the conditions of culture. When the *spores*, however, of the anthrax bacillus were introduced in the carbolized oil solutions, reproduction could be accomplished after three months' immersion. The same results were met with in oily solutions of thymol and salicylic acid. In explanation of the antiseptic action of carbolized oil as a wound dressing, Koch, however, remarks that, "when it comes in contact with substances containing water—as, for instance, the tissues of the human body wounds, etc.—then it undoubtedly gave up part of the acid to these, and in this way an antiseptic effect may be obtained. But this holds good only in cases where aqueous fluids came in contact with the oil. In all

¹ *Arch. Gen. de Médecine*, March, 1883. Les dernières Évolutions des Pansements Antiseptiques.

² *Deutsche Zeitschrift f. Pract. Med.*, No. 18, 1877.

other instances where dry substances, such as silk, catgut, instruments, etc., are to be disinfected by carbolic oil, not the least antiseptic effect is to be expected even upon the most vulnerable micro-organisms." These investigations, it may be added, have been fully confirmed by those of Wolfhügel and Knowe in the same volume of reports. Kocher, of Berne (already quoted), also made sundry experiments bearing on this point. This surgeon placed ordinary catgut, with all the customary precautions, in sterilized fluids, which became turbid from bacteric development within twenty-four hours. He also found that if the catgut were steeped for twenty-four hours in the oil of juniper, and kept in ninety-five per cent. alcohol, it would not develop bacteria in sterilized fluids. I do not know of any experiments that will determine whether the chromic acid, used to render the catgut ligature more durable, makes them at the same time antiseptic; but we have information relative to sulphurous acid, which will be somewhat startling to the surgeons in this city who have relied upon this gas as a proper disinfectant for their contaminated hospital wards. The investigators, Koch and Wolfhügel, pronounce decidedly against sulphurous acid in gas and in watery solution as a disinfectant—*i. e.*, as an arrester of bacteric life. Koch says no real value can be claimed for it, and in none of the experiments instituted with it did it succeed in destroying all the germs present. The reliability of the tests of Koch and his assistants should attract attention to this point, as not only is this agent largely employed here in hospitals as above alluded to, but it is likewise recommended to the public by our health boards for disinfection after scarlatina, diphtheria, and other contagious diseases. I may remark, in passing from this portion of my subject, that the most reliable disinfectant for closed spaces was found in bromine, and ranking a little lower was the less expensive chlorine.

Returning to the catgut, it must be admitted that while thus open to the suspicion of a septic agent, yet the daily experience of surgeons has taught that its principal defect was in its unsatisfactory insolubility. Since the addition of chromic acid and sulphurous acid to it, its durability in the tissues has been too much increased, and, though the latter acid has permitted the catgut to be kept in a dry state, and the oil thus avoided, yet I have found that it will not dissolve for twenty to thirty days, and that it acts often as a foreign body. Weakening both the acids has improved it somewhat, but my experience in this line has not been sufficient to speak yet with positiveness.

The probing of scientific research has in this way revealed to us some of the weak points of the carbolic dressing. But notwithstanding this and the earlier condemnation of the spray by Trendelenburg, Bruns, Mikulicz, Wernich, Duncan, and others, a verdict which is, however, not accepted by Lister, Nussbaum, Rydygier, Chiene, and their followers, Lister's dressing has remained until very recently the best for surgeons to employ, though other antiseptics, notably iodoform, have given very satisfactory results in other hands. The volatility of the former antiseptics, and the toxic properties of both those named, were decided disadvantages.

Very lately an old remedy has appeared in the rôle of an antiseptic. This is the corrosive sublimate, or the old bi-chloride of mercury, the mercuric bi-chloride of the new nomenclature. My first experience with this salt as a wound dressing was obtained after reading an excerpt from the article of De La Croix, in which it was stated, that corrosive sublimate in the proportion of 1 part to 2,525 parts of water was an efficient germicide, being two hundred and fifty times more powerful than phenol or carbolic acid. With this imperfect data, I used it in the spring of 1882.

I used it in 1 part to 2,000 of water as a dressing to three compound fractures of the thigh, and six of the leg, with very satisfactory results ; so much so that when I resumed my service in the New York Hospital in November last, the dressings were continued, but with some slight modifications. These were—first, that it was found that the strength was insufficient, active bacteric life being at times found under the dressing, and also from the fact that a perusal of the large experience of Kümmell and Schede, of Hamburg, showed that a stronger solution was required, and that it was free from the risk of toxic effects ; for in over two hundred cases presented by Kümmell, in only two were there any constitutional symptoms observed, and then only a slight salivation. This surgeon says of the sublimate dressing, that the healing of wounds is accomplished with a certainty and uniformity unknown under the strictest Lister dressing, and in 212 extensive wounds as recently treated by the sublimate solution, and peat dressing by Esmarch and Neuber, who recommend it strongly, there was no poisoning, and only three deaths. In the number were thirty major amputations, thirty-two resections and osteotomies, five herniotomies, fourteen cases of nerve stretching, etc. In only eleven cases was the dressing changed more than once. Bergmann, whose experience with this remedy has also been large, also lauds it. My own observation of the efficacy of the sublimate dressing, after I had properly achieved the correct method of using it, is but comparatively slight, embracing four cases of necrosis of the foot and tibia, one amputation at the hip-joint, one amputation of the thigh, one amputation of the leg, one amputation at the knee, one amputation of the breast, two removals of tumors, one fixation of a movable kidney, one extensive laceration of upper thigh (died twelfth day of septicæmia), one subdeltoid bursa, and three compound fractures

of leg, with recovery of all, excepting the one above noted. In two of the compound fractures an aseptic condition was not preserved. In one of these the solution was too weak 1 in 2,000. In the other, a 1 to 400 peat dressing was used, although by error solutions of 1 to 100 were several times resorted to. No special local effects were produced beyond ; in one instance slight pustulation of the adjacent skin. No constitutional effects were noticed in any case.

Let me hastily indicate the mode of employment of the dressing. Carbolic acid solutions are used by Neuber, Kümmell, and Bergmann, for the spray and for the instruments, and sometimes for washing out the wound. The sponges and compresses are wet with a solution of the sublimate, two gr. to the pint (solution No. 1). Silk, if used for sutures, etc., is dipped for two hours in an eighty gr. to the pint solution, and then permanently kept in the eight gr. solution. Catgut, as used by Kümmell, is made by immersing it in an eighty gr. to the pint solution, for twelve hours, and then is wound on bobbins, and kept in an alcoholic solution of twenty gr. to the pint, with one and one-half ounces of glycerine added.¹ The gauze is prepared by immersion in a solution of twenty gr. to the pint of alcohol and one and one-half ounces of glycerine. Drainage is accomplished by rubber tubes, or by spun glass, twisted or plaited. If sand is used as an absorbent, after being heated in a crucible, it is mixed in the proportion of one pound to one drachm of sublimate, dissolved in two and a half ounces of sulphuric ether. The sublimated sand is put in bags of various sizes, from twelve to forty centimeters square, which have previously been washed in green soap and soda, rinsed, and finally dipped in the eight gr. to the pint solution.

¹ This catgut dissolves too quickly in a wound. That made by Kocher by immersion in oil of juniper is stronger and lasts longer.

Peat, sawdust and other absorbents,¹ are also employed according to the judgment of the surgeon. It has been found in my wards that while pine sawdust has absorbed readily, yet a disagreeable sour odor was often noticed, even when the underlying wounds were doing perfectly well.

A few words more will complete these necessarily incomplete remarks. The experiments of Koch evidently incited the surgeons of Hamburg, Würzburg and Kiel, to the use of the mercuric bi-chloride as a surgical dressing, and as the results of this able investigator have not been very widely disseminated on this side of the Atlantic, I beg to summarize them here. After applying a number of tests to various of the so-called antiseptic disinfectants (a partial list of which is here appended), he found that simply moistening the anthrax spores (the most resistant of all, it will be remembered) in a solution of one part of corrosive sublimate to 5,000 of water destroyed them thoroughly and immediately, and the destruction would equally happen if they were immersed for a longer time in solutions as weak as 1 to 20,000. He then says that the sublimate is the only known disinfectant which succeeded by a single application of a few minutes, of a solution of 1 part to 1,000 of water, in destroying the most resistant micro-organisms. He also furnishes us with a test as to the strength required in a wound dressing. There should be present in a dressing an excess of corrosive sublimate equal to 1 part to 5,000. This will be readily recognized by leaving a thin strip of polished copper for half an hour in the dressing. If the excess is present, an amalgam will show itself. This seldom occurs in a 1 to 10,000 solution.

Naturally with so potent a bacteric arrester the idea

¹ The absorbing power of turf is, eighty parts water; sawdust, pine, 55 parts; sawdust, cedar, 44 parts; tan, 23 parts; sand, 14 parts.

comes into birth, cannot the internal administration of this remedy be utilized in germ diseases. Koch's experiments in anthracised rabbits by injecting sublimate solutions, however, were negative. Sternberg, estimating the blood in an adult of 160 pounds to be 20 pounds, ascertained that the quantity of corrosive sublimate required to affect this amount of blood would be 3.5 grains, which would be toxic. I believe, that, although one grain per diem is the maximum quantity which could be administered for several days, in time perhaps a cumulative effect might be produced by its use sufficient to exert some restraining influence on the development of micro-organisms within the system.

The annexed tables, taken from Koch's and Sternberg's papers, give an interesting résumé of the germicidal power of a number of agents, some of which have wrongly been relied upon.

TABLE I. (FROM KOCH.)

Corrosive Sublimate, one per cent. in water, destroyed all bacteric life in.....	*1 day.
Permanganate of Potash, five per cent., destroyed all bacteric life in	*1 day.
Permanganate of Potash, one per cent., no effect at end of.....	2 days.
Osmic Acid, one per cent.....	*1 day.
Turpentine, oil of	*5 days.
Chlorine Water, freshly made.....	*1 day.
Bromine, two per cent	*1 day.
Iodine Water.....	*1 day.
Chloride of Lime.....	*5 days.
Chloride of Iron.....	*6 days.
Iodine in Alcohol, one per cent., hindered growth only....
Arsenic, one per cent.....	*10 days.
Sulphurous Acid Water, very slightly efficacious.....
Sulphuric Acid, one per cent., growth hindered in.....	10 days.
Quinine, one per cent.....	*10 days.
Boracic Acid, five per cent., practically unreliable; spore growth only hindered in.....	61 days.
Borax, five per cent., no effect at end of.....	15 days.

* Indicates life destroyed totally.

TABLE II. (FROM STERNBERG.)

Germicide Value of

Mercuric Bichloride.....	One part in	20,000
Potassium Permanganate.....	" "	833
Iodine.....	" "	500
Creasote	" "	200
Sulphuric Acid.....	" "	200
Carbolic Acid.....	" "	100
Hydrochloric Acid.....	" "	100
Zinci Chloridi.....	" "	50
Tincture Ferrichloridi.....	" "	25
Salicylic Acid dissolved by Sodium Borate.....	" "	25
Boracic Acid.....		No Value.
Sodium Borate, Sat. Sol.....	" "	
Sodium Hyposulphite..	" "	

A METHOD OF RESECTING THE SECOND
BRANCH OF THE FIFTH NERVE IN
THE SPHENO-MAXILLARY FOSSA,
USING THE SURGICAL ENGINE.

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A DIAGNOSIS being made, and the necessity for section of the nerve accepted, a manner of accomplishing the performance, the easiest yet tried by the writer, is as follows:

Place the patient upon a narrow table or other convenient bed, the body inclining at a rising angle of about fifty-five degrees, and etherize.

Next expose the anterior boundary of the antrum by means of a trap cut in the cheek, which trap opens toward the eye and is to hold the branchlets of the infra-

orbital nerve, which branchlets are to be dissected in bulk from the flap and caught in the grasp of a spring forceps.

A succeeding step treats the hæmorrhage. The writer uses phenol sodique, pouring it, undiluted, into the wound, and employing a temporary sponge compress; not omitting, of course, the ligation of vessels if this be found necessary.

Following the arrestation of hæmorrhage is removal of antral wall; the whole being taken away. To accomplish this a bur is used. Placing the instrument in the grasp of the handpiece of an engine, a moment suffices for the work. In doing this manipulation a trifle of care is demanded that the nerve be not cut.

Using the same bur the operation proceeds to the removal of floor of infra-orbital canal, continued and increased care being exercised that the nerve, as it lies in this canal, be not disturbed.

The floor of the canal being cut away, the forceps are used to pull the nerve out of its bed into the antrum. Being now under control as to position, and being, as well, clearly in sight, it is followed by the bur into the orbital cavity in like manner as it was exposed in the canal. The floor of the orbit being removed, the increased length of nerve secured is pulled into the sinus as before.

Following is the introduction into spheno-maxillary fossa through removal of posterior wall of antrum. Here the same, or a smaller, bur may be employed. The seat of operation being of deep situation great caution is adopted to avoid losing control of the nerve through the accident of its premature cutting by the teeth of the revolving tool.

The reader will please refer here to the diagram. The round hole in front, indicated by the point of the forceps, as the nerve is grasped, is the opening made through the facial wall of the antrum. The orbital apex, where nerve and hook are seen to disappear, shows the spheno-maxillary fis-

sure, the position of entrance of nerve into the orbit. The great opening between the two is the orbital cavity from which all the contents have been removed, the superior



FIG. 1. RESECTION OF SECOND BRANCH OF FIFTH NERVE AT BASE OF SKULL.¹

maxillary nerve excepted, which nerve is seen lying in its place on the posterior portion of the floor of the cavity and anteriorly disappearing in the infra-orbital canal; later reappearing at the infra-orbital foramen, included, in the cut, in the hole first described.

Having the nerve all clear as far back as the foramen rotundum and possessing absolute control of it through means of the forceps, a concluding step takes an instrument of hook shape, fenestrated at its extreme end, and, slipping this about the nerve, it is pushed back, isolating the nerve, until it reaches the base of the skull. Here, a pair of most delicate scissors, curved in the blade, are taken up, and, following with these the hook, the nerve is severed and withdrawn. An operator, not possessed of proper scissors, may use a curved tenotome.

¹ We are indebted for a loan of this cut to Messrs. J. B. Lippincott & Co., of Philadelphia, publishers of Dr. Garretson's System of Oral Surgery.

CASE OF SUBCUTANEOUS SECTION OF FEMUR ABOVE TROCHANTER MAJOR.¹

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BELIEVING that cases amongst which we would class the following are not so very numerous, I have thought best to report this one.

Miss P., aged nineteen, possessing a bright, happy expression of face and very cheerful disposition, through the kindness of Dr. S. Peters, of Cohoes, came under my observation first in September, 1881, giving the following history :

At the age of two years she fell down stairs, and shortly after she was noticed to turn slightly when walking, and soon complained of pain in the knee. She was treated for rheumatism. Three years after, the limb began to contract, and an extension splint was applied. Shortly afterwards, when the splint was removed, she fell again, injuring the same limb. After this the joint underwent severe inflammatory changes, suppuration taking place, and finally ankylosis resulted.

At the time she entered the Albany Hospital—October 5, 1881—the left leg was ankylosed at the hip-joint ; it was partially flexed on the body and adducted, the knee being

¹ A portion of this paper was read at the meeting of the New York State Medical Society, February, 1882, but not published in full until now, that the result might be known more positively.

thrown in front of the right one. She walked by the aid of a raised shoe and cane, turning the whole pelvis, there being extreme mobility as well as a curvature anteriorly of the spine in the lumbar region. When lying in bed, the leg was flexed and the curvature in the lumbar region very marked.

For the relief of the deformity which made sitting and



FIG. 1 LINE OF SECTION OF NECK OF FEMUR.

walking so difficult, it was decided to do a subcutaneous section of the neck of the femur. October 10th, the patient having been put under ether by Dr. Mosher, assisted by Drs. Ward, Snow, Hailes, Vander Poel, Jr., and house staff, I made an incision a little over the top of the great trochanter, and divided the muscles down to the neck of the bone by the use of Shrady's trocar with saw. So far the operation was subcutaneous, but, on attempting to use the saw (which for a time gave us great embarrassment, trying to saw from within out, thus avoiding the femoral vessels),

it broke off in the wound, necessitating its enlargement, which was done antiseptically under the spray. The broken saw was removed with some difficulty, and the operation proceeded with, the section of bone being completed by an ordinary long, narrow, metacarpal saw.

It was found necessary, after the section of the bone,

which was made just above the trochanter major, to perform tenotomy on the tendons of the adductor muscles.

Fig. 1, copied from a specimen in my private museum, Albany Medical College, gives a very fair illustration of the supposed condition of the joint and position of the femur; also the direction of the incision through remains of the neck of the bone.

Extension was then applied to the limb by means of the stocking and bandage, with about fifteen pounds weight, and kept up for about six weeks. A small abscess formed at the point of the tenotomy, but the wound over the trochanter healed kindly.

There was considerable oscillation of the temperature, it occasionally going quite high. This, however, gradually improved, and, at the end of about seven weeks, she was allowed to sit up, and soon after attempted to use the crutches. The condition at this time was about as follows: The limb is nearly straight with the spine when lying on her back, the shortening being only about one and a quarter inches.

January 25, 1882, one hundred and seventeen days after the operation, she writes: "In lying on my back and with the limb straight, the knee is raised somewhat, but not uncomfortably so; on either side I lie naturally. The position when sitting is upright and a slight bending forward is possible. As I bear more weight on that foot, I find my back is not as straight as was at first supposed—not as before, however, deformed. With the cane I walk easily, not being obliged to turn as those with a stiff joint; without it I do not walk well, but bend toward that side. I do not think the motion of the hip-joint increases very much. The foot cannot be reached as the other is, but only by bringing it backward. This is the only difference I notice in the use of the limbs."

The patient's parents write that the improvement is far beyond anything they had expected.

In a letter dated October 10 1882, she says: "One year ago to-day, at this time in the evening, I felt as though I had been used pretty badly, but I have changed my mind since then. To-day I think I never took a better step in my life than the one I took in getting upon that dreadful operating table. I do not regret it in the least. I wish you might see me for yourself. Since the middle of June I have walked without my cane. At first, awkwardly and fearfully, but now easily, and, I think, without much limping. My general health is excellent. I do not find myself inconvenienced by my lameness at all. In fact, I hardly believe myself the same girl who went to the hospital a year ago. When getting about after my return home, had to have all my clothing changed, dresses being too short, and in many ways my form has altered decidedly."

July 12, 1883, I made an examination of Miss P.'s case, and found the improvement in her walk, the erect position she assumes in standing, and the ease with which she can sit down, and also bend forward in putting on her shoe and stocking, to be truly wonderful. The apparent curvature of the spine has disappeared. There is, without doubt, some motion at the hip, which she is sure is increasing. In walking, a stranger would scarcely notice any defect. The limb has developed in size, and, as regards length, she wears the shoe of that foot raised only about half an inch.

The case may be looked upon, I think, as in every way a decided success.

The saw was repaired by Messrs. Tieman & Co., who found a flaw at the point of breaking, and in another similar case I should certainly use it.

A CASE OF STRANGULATED INGUINAL HERNIA, COMPLICATED WITH AN UNDESCENDED TESTICLE—HERNIOTOMY—EXTIRPATION OF THE TESTICLE.

By SIDNEY A. FOX, M.D.,

OF BROOKLYN, N. Y.

CHARLES M., æt. twenty-three, single, and by occupation a farmer, was brought to the office of Dr. Charles M. Carleton, of Norwich, Conn., February 6, 1883, suffering from strangulated hernia. He had had a right oblique inguinal hernia for ten years, which was supposed to have followed a kick in the groin. On making an examination, a large painful tumor was found in the region mentioned, and, internal to the external ring, a smaller tumor was detected, which proved to be an undescended testicle. Symptoms of strangulation being present, as manifested by pain near umbilicus and over the hernia, nausea, vomiting, and failure of taxis to reduce it, with the aid of an anæsthetic, it was decided to operate. The operation was performed by Dr. Carleton and myself in the usual manner. The intestine was found to have a very dark color, but after the removal of the constriction its natural color began to return, and it was replaced in the abdominal cavity.

For the following reasons it was deemed best to remove the testicle :

1. It was so painful that a truss could not be worn.
2. It was atrophied and could not be forced into the scrotum.

3. By leaving it *in situ* it would interfere with union of the wound.

The nerves (spermatic plexus) were carefully dissected from the cord, and divided with a scalpel. The remainder of the cord was tied with a carbolized catgut ligature, and the testicle excised. The reason for not including the nerves in the ligature was to do away with the supposed danger of tetanus. Wound was closed with interrupted sutures.

The further progress of the case to recovery, was rapid, and unmarked by any untoward symptom. Temperature rose above 100° F. but once, and that was on the third day after the operation. Upon the following day the temperature was again normal. On the ninth day his recovery was regarded as complete. No antiseptic precautions were used except to carbolize the instruments and the hands of the operators.

ON SOME ANATOMICAL VARIATIONS, WITH REMARKS ON THEIR MORPHOLOGY.

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THE variations described below are some of the most interesting that were noticed in the anatomical rooms of McGill University during the winter session, 1882-3.

MENTO-HYOID OR HYO-MENTAL MUSCLE.

Three examples of this muscle were noted; two on the left side and one on the right. It was once seen on both sides of the same subject. In the first case this muscle consisted of a small slip quite distinct from the anterior belly of the digastric. It arose from the lower jaw near the symphysis, internal to the attachment of the digastric, and passed downwards over the mylo-hyoid muscle, to be inserted into the body of the hyoid bone. In this case the left digastric had two anterior bellies, the supernumerary one being given off from the fascia at the level of the hyoid bone.

The other two cases occurred in the same subject. The muscles arose, as usual, from the lower jaw, between the insertions of the digastric, but did not reach the hyoid bone. Spreading out as they descended, they ended in a strong fascia covering the mylo-hyoid, and attached below to the hyoid bone. In the same subject the

right digastric gave off a small slip of muscle which passed beneath the mento-hyoids, and blended with the mylo-hyoid of the opposite side.

MacAlister¹ has fully described this muscle, and considers that it is a differentiated portion of the platysma. He mentions that, in one case, it blended with the genio-hyoid, the intervening portion of mylo-hyoid being absent. The last variety I have described approaches this form, the strong fascia into which the muscle is inserted would represent the subhyoidean septum. The mento-hyoid or hyo-mental exists normally in many animals—*e. g.*, the hippopotamus and bat. Prof. Humphry² considers that the anterior belly in man is formed from the middle portion of the hyo-mental, which accounts for its insertion near the symphysis. In the cases of mento-hyoid narrated above, it is the inner portion of the hyo-mental which persists as well as the middle. The shifting insertion of the digastric into the jaw in many of the lower animals, according to Prof. Humphry,³ is explained by the fact that its anterior belly may be formed by different parts of the hyo-mental in different animals. The hyo-mental (and, of course, the anterior belly of the digastric) is formed from the superficial brachio-cephalic stratum of muscle.

DOUBLE STYLO-HYOID.

This anomaly was met with *five* times; twice on both sides of the same subject. In all five cases the extra muscle took the place of the stylo-hyoid ligament, and extended between the styloid process and lesser cornu of the hyoid bone passing beneath the hyo-glossus muscle. This arrangement is found in some of the edentata.

¹ Proceedings Royal Irish Academy, vol. xxv.

² Observations in Myology, p. 138.

³ Loc. cit.

CHONDRO-SCAPULAR.

This muscle occurred three times ; once on both sides of the subject.

The first example met with was on the left side of a muscular male subject. It arose by a round tendon from the costal cartilage of the first rib, soon developed into a large fleshy belly, which, after running parallel to the clavicle for a short distance, crossed beneath it and passed over the subclavian artery, and between the supra-scapular vein and artery ; continuing outwards, it ended by being inserted into upper border of the scapula immediately external to the notch, some of its fibres were attached also to the transverse ligament of the notch. In this subject, on the same side (left) there was no trace of a subclavius, and the omo-hyoid muscle arose from the middle of the clavicle. In the same subject, and on the left side, was a mento-hyoid muscle, and the anterior belly of the digastric was double. There was also a levator thyroideæ.

The other two examples of this muscle occurred in a muscular male subject. The course on each side was precisely the same. The muscle arose by a round tendon from the costal cartilage of the first rib, passed *over* the clavicle near its sternal end, and piercing the cervical fascia above the clavicle developed into a well-formed fleshy belly, which crossed the scalenus anticus muscle and third part of the subclavian artery, and was inserted into the root of the coracoid process. On each side the subclavius was of small size. I have now seen seven examples of this muscle, and with the exception of these two (occurring in the same subject), all passed *beneath* the clavicle. In the Norway rat, guinea pig, wombat, etc., this muscle exists as the sterno-scapular. In the horse it is a well-developed muscle. In the first case

described above, it would seem to have embodied the subclavius, as that muscle was absent. In animals without clavicles some authorities consider it the homologue of the subclavius.

CLEIDO-OCCIPITAL.

Two examples of this muscle were seen. The first occurred on the right side of a male subject. It arose from the middle of the hinder border of the clavicle, and passed up as a muscular band two centimetres broad, and quite distinct from the sterno-mastoid, to be inserted into the occipital bone, between the trapezius and sterno-mastoid. The second case occurred on the left side of a female subject. It was not so well marked as the foregoing, as immediately before its insertion it blended with the sterno-mastoid. This muscle is well marked in the hedge-hog, mole, etc., and, according to Prof. Wood,¹ corresponds to the cephalo-humeral muscle of many of the lower animals.

RECTUS STERNALIS.

On the left side of a male subject a well-marked example of this muscle was seen. The muscle arose from the costal cartilage of the fifth rib by a broad tendinous expansion, passed upwards over the fourth and third costal cartilages to the second, to which it was attached by a few aponeurotic fibres, the main portion, however, was attached to the first costal cartilage, and the inner portion ended in a tendon which, after crossing the first piece of the sternum, became continuous with the inner border of the sterno-mastoid of the opposite side. The muscle was in no way connected with the rectus abdominis, and was superficial to the pectoralis major (see Fig. 1).

¹ Proceedings Royal Society, 1870.

Prof. Turner,¹ in a most interesting essay on this muscle, holds that it is not, as was formerly supposed, homologous with the anterior or pectoral end of the rectus abdominis. The rectus, when prolonged upwards in the lower animals, is always beneath, or rather deeper than the great pectoral muscle. The rectus sternalis of man is always superficial, so Prof. Turner² regards it "as an additional rudiment in man of that very im-

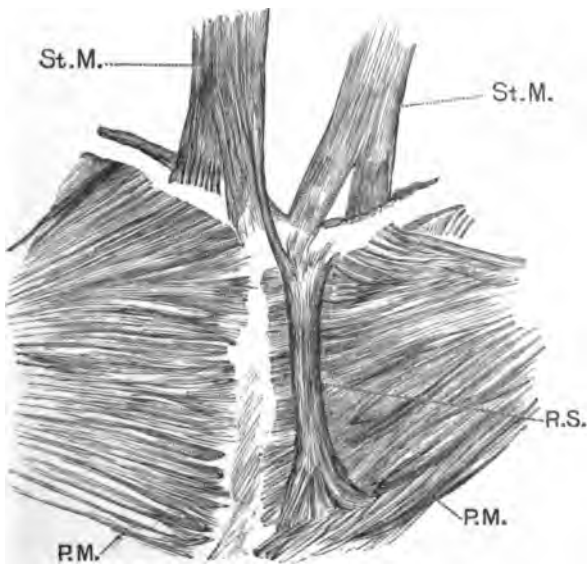


FIG. I. RECTUS STERNALIS MUSCLE.

R. S., rectus sternalis; St. M., sterno-mastoid; P. M., pectoralis major.

portant tegumentary muscle (the panniculus carnosus), though it must be admitted that the human platysma lies on a plane superficial to the fibres of the sternalis in those individuals in whom they co-exist." I have seen one case of rectus sternalis which was continuous with

¹ *Journal of Anatomy and Physiology*, vol. i.

² *Loc. cit.*

the platysma, but the case described above was directly continuous with the sterno-mastoid, and some anatomists (Henle, Theile, and others) consider this muscle a continuation downwards of the sterno-mastoid, as in man, when it exists, it is so often connected with the sterno-mastoid. In many mammals the attachments of the sterno-mastoids are continued backwards superficial to the pectoralis major.¹

Dr. G. E. Dobson² looks upon the *musculus sternalis* "as homologous, not with the *panniculus carnosus* lining the integument, but with the sterno-cuticularis (sterno-facialis of the hedge-hog), which is found in many species of mammals springing from the sternum and attached to the deep surface of the *panniculus carnosus* either in front of or behind the anterior extremity." This, however, does not satisfactorily account for its continuation in many cases with the sterno-mastoid.

PECTORALIS MINOR.

In three cases this muscle blended with the coraco-brachialis, or more properly speaking, its lower border was inserted into the coraco-brachialis, forming at the point of junction a broad tendinous intersection. It was once seen having no insertion into the coracoid process, but the whole brachial end was fused with the coraco-brachialis for about two inches. This is an approach to the insertion of the pectoralis minor into the humerus, as is seen in *quadrumana* and some of the *carnivora*.

DOUBLE CORACO-BRACHIALIS.

On the right side of a male subject the coraco-brachialis had two insertions: (1) the normal one into the inner side of the middle of the humerus, and (2) a second one

¹ Prof. Turner, loc. cit.

² *Journal of Anatomy and Physiology*, October 1882.

into the internal condyle of the humerus. The supernumerary portion arose with the normal muscle from the coracoid process, and consisted of a strong muscular slip which passed down the arm internal to it; after crossing the vessels and nerves of the arm about its middle, the slip became tendinous. This tendon blended internally with a broad aponeurotic band, which covered the internal portion of the triceps muscle and the ulnar nerve, and reached from near the head of the humerus to the internal condyle. The tendon proper of the muscular slip above described continued on, and was inserted into the lower part of the internal condyloid ridge. Prof. Wood¹ has fully described a similar anomaly, and mentions that he has met with three varieties of coracobrachialis muscle in man: (1) The normal arrangement, which he calls the coraco-brachialis proprius; (2) where the muscle is inserted into the internal condyle (coraco-brachialis longus); and (3) the rarest variety where the muscle is inserted into the capsule of the shoulder close to its insertion into the anatomical neck of the humerus, immediately below the lesser tuberosity. This has been described as the coraco-capsularis. Prof. Wood calls it the coraco-brachialis superior vel brevis. All these varieties exist normally in the lower animals. In a bear which I lately dissected, the short and long variety existed. In most of the quadrumana there is a double insertion of this muscle, in the dog and cat the short variety alone exists,² and in the guinea pig the median variety only is present, as in man.

FLEXOR INDICIS.

On the right side of a male subject there was a distinct flexor indicis muscle, separated from the profundus by a

¹ *Journal of Anatomy and Physiology*, vol. i.

² Prof. Wood, loc. cit.

well-marked cellular interval. It was of considerable size, and arose from a small portion of the ulna, the interosseous membrane and a portion of the radius internal to the flexor pollicis; there was a well-marked tendinous intersection between it and the flexor pollicis. In the ourang, chimpanzee, and gorilla, there is a distinct flexor indicis.¹

FIBULO-ACCESSORIUS.

This supernumerary muscle arose on both sides of the same subject from the lower fifth of the posterior border of the fibula, its fibres blending with those of the peroneus tertius, its course was then downwards behind the inner malleolus and posterior to the flexor hallucis, where it ended in a round tendon which grooved the astragalus and os calcis, and was enclosed in a separate sheath; it finally ended by being inserted into the deep surface of the long flexor tendon with the accessorius. I have several times seen a similar slip, which arose from the lower part of the tibia (tibio-accessorius), but never before one quite like this. It probably was a differentiated portion of the longus hallucis. Its morphology I am unable to determine.

TRIPLE ANTERIOR COMMUNICATING ARTERY.

In the brain of a female subject the two anterior cerebral arteries were connected together by three distinct communicating arteries. They were of small size. I have frequently seen the anterior communicating artery so short that the two anterior cerebrals seemed fused together, but this is the first time I have seen it multiple. The two cerebral arteries in this case were separated by a considerable interval.

INTERNAL MAMMARY.

This artery was once seen to come off from the thyroid axis, and it, in another case, gave off the suprascapular.

¹ W. J. Walsham, St. Bartholomew's Hospital Reports, 1880.

ABERRANT ARTERY.

On the left side of a male subject, opposite the insertion of the latissimus dorsi, a large branch was given off from the brachial which passed down the arm internal and parallel to the brachial, and joined it again at the bend of the elbow. The main artery, after receiving the aberrant branch, almost immediately divided into radial and ulnar. The aberrant artery was quite as large as the brachial, which, in this instance, was smaller than usual.

INTERNAL CIRCUMFLEX FROM THE DEEP EPIGASTRIC.

This occurred on the left side of a male subject. The epigastric arose from the external iliac, about half an inch above Poupart's ligament, and almost immediately gave off the internal circumflex. From this origin the internal circumflex passed beneath Poupart's ligament, within the femoral sheath (being enclosed in the same compartment as the common femoral), and continued down the thigh for nearly two inches, lying between the femoral vein and artery; it then gradually proceeded inwards across the femoral vein to dip down between the pectineus and psoas muscles. Before doing so, it gave off a large branch, corresponding to a portion of the profunda, which was distributed to the adductor muscles (see Fig. 2). The external circumflex was given off directly from the femoral, and the profunda did not come off till the main artery reached the apex of Scarpa's triangle. It was of small size. In a bear which I lately dissected, on both sides the internal circumflex was of large size, and was given off from the external iliac some distance above Poupart's ligament, and continued downwards within the femoral sheath, lying between the vein and the artery; about an inch below Poupart's ligament it proceeded to its destination by dipping down between the vein and artery. I have several times seen the internal circum-

flex and deep epigastric arteries given off from a common trunk, and once I noticed a common trunk for the internal circumflex, epigastric and obturator; but in all cases this occurred *below* Poupart's ligament. This is the first time I have seen this rare anomaly of the internal circumflex arising with the epigastric *above* the ligament. Mr. Arthur

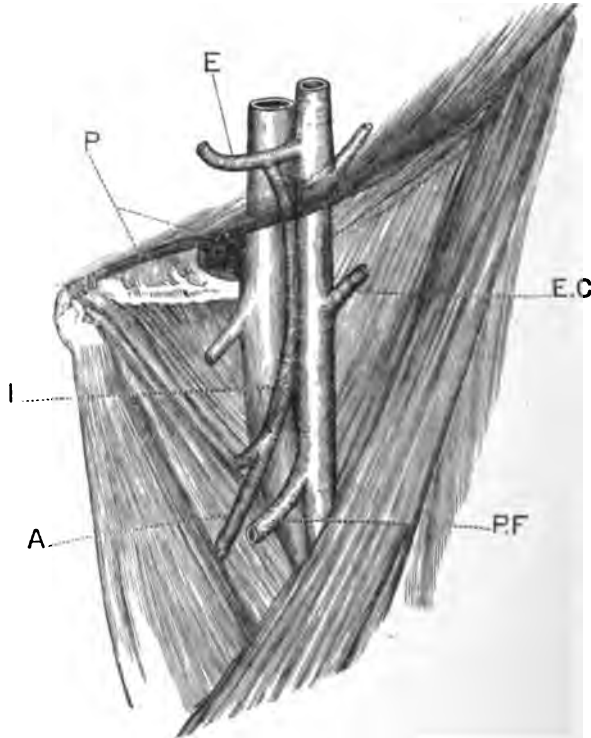


FIG. 2. ABNORMAL ORIGIN OF INTERNAL CIRCUMFLEX ARTERY.

P., Poupart's ligament; E., epigastric artery; I., internal circumflex; A., branch from circumflex to adductor muscles; E. C., external circumflex; P. F., profunda femoris.

Thompson,¹ in a recent number of the *Journal of Anatomy and Physiology*, gives an account of two cases in which there was this unusual arrangement of the arteries. In one case the internal circumflex, after leaving the epigastric, curved

¹ April, 1883.

inwards and downwards, lying internal to the femoral vein and winding to the inner side of the crural ring, where it gave off the external pudic. It then rested on the pectineus muscle, being bound down to it by strong fascia. The artery being in this position would, in the event of a hernia coming down, surround the neck of the sac, and, in case of operation, would be in danger of being wounded. It would, however, be a much simpler matter for the surgeon to secure it than an abnormal obturator.

In Mr. Thompson's second case the common trunk was larger, and crossed the external iliac vein at a point corresponding to the septum, between the compartment for the vein and crural canal, the artery pierced the sheath and split into the deep epigastric and internal circumflex, the latter crossed downwards, being in contact with and to the inner side of the vein. In this case, Mr. Thompson thinks, if a hernia had existed, it would have pushed the artery to the outer side, and the vessel would not have been in any danger should an operation for strangulated hernia have been needed.

LEFT SUPERIOR VENA CAVA.

This occurred in an old woman aged 70. The heart was considerably larger than normal, and its right side and the veins emptying into it were full of blood. The right cava and transverse innominate were not much reduced in size or length, and were normally placed. The persistent left cava, or rather the left duet of Cuvier, passed down over the arch of the aorta and root of left lung, pierced the fibrous pericardium and joined the coronary sinus (which was much enlarged), and through it entered the right auricle. The opening into the auricle was of great size. The persistent vein was about the size of a common lead pencil, and received just below the point where the transverse branch was given off a large vein which returned the blood from the upper four intercostal spaces. The azygos veins were nor-

mal. The thyroid veins emptied into the transverse branch. This is the second example I have seen of this anomaly in two hundred and fifty subjects; both occurred in adults. In my other case¹ the persistent vein was much larger. Both specimens are now preserved in the museum of McGill University. This arrangement of the veins is the normal one in birds and some mammals, as, *e. g.*, the rabbit. Mr. Marshall has ably worked out the development of the great veins of the neck, and has fully described the cause of this anomaly. Mr. Walsham² has, lately, very fully described a well-marked case of persistent left cava.

LARGE OCCIPITAL SINUS.³

The right occipital sinus was twice seen, of very large size—quite as large as the ordinary lateral. In both these cases the lateral sinus was so small that it would only admit a probe. J. T. Knott³ has, lately, fully described the variations of the lateral sinuses.

DISPLACED KIDNEYS.

In an elderly female subject, who had borne children, the kidneys were seen two inches lower than normal. The lower end of the left kidney rested on the external iliac artery, the lower end of right in the iliac fossa. The upper end of each kidney was below the last dorsal vertebra. The left kidney received two branches from the aorta—one given off normally entered the hilus, the other was given off from the aorta just above its division and entered the extreme lower end of the kidney. On the right side the renal artery, before entering the hilus, divided into four branches. From the position of the supernumerary renal to the left kidney, I should judge that the left kidney, at any rate, was congenitally misplaced. Both kidneys were firmly fixed in their abnormal position.

¹ Montreal General Hospital Reports, vol. i., 1880.

² St. Bartholomew's Hospital Reports, 1880.

³ Proceedings of International Medical Congress, 1881, vol. i.

NEW YORK SURGICAL SOCIETY.

RUPTURE OF THE TENDON OF THE QUADRICEPS EXTENSOR CRURIS ON EACH SIDE.¹

DR. L. A. STIMSON presented a patient with the following history: The patient is a rather small, spare man, fifty-eight years old, who has always been healthy. Ten years ago he slipped while walking, fell backward to the ground and found himself unable to use his right leg. He had broken the tendon of the quadriceps apparently at its junction with the patella. The knee became at once painful and swollen, and he remained unable to walk for four weeks. During the following six months he walked with a cane, and noticed disability of the limb when going up or down stairs, finding himself unable to support his weight upon it when the knee was partly flexed. After the expiration of the six months he discarded the cane, and considered the limb about as good as ever; he could carry a load of fifty to seventy-five pounds upstairs in the usual way, taking the steps with each foot alternately, and not aiding himself with his hands. He says the appearance of the knee differed from what it was before the injury: that there was a depression above the patella, and the anterior edges of the condyles were prominent.

Three years afterwards (1876), he broke the tendon of the left quadriceps by a similar slip and fall backward. It was treated in the Chambers Street Hospital, by rest in bed with the limb bandaged upon a posterior splint. The knee was swollen and painful for three weeks, and more or less stiff for six months afterwards. Then he resumed work as a porter, and worked steadily until January, 1883, his right leg being all this time stronger than the left. His duties frequently required him to carry loads of fifty to one hundred pounds on his shoulder. In walking he kept the knee almost perfectly straight, and occasionally he fell heavily, this happening whenever he slipped and

¹ Stated Meeting, April 10, 1883.

bent the knee. In going up and down stairs he always aided himself with his hands on the bannisters; he says he was always fearful lest he should fall. Yet he carried weights, and even climbed ladders. He could not rise from a sitting posture without aid, unless the seat was so high that the knees were extended.

Early in January, 1883, the right knee-joint suppurated, from unknown cause, and he entered Bellevue Hospital. The joint was opened in the median line above the patella, drained, and immobilized. The discharge ceased about the end of February.

His present condition is as follows: Left knee. When the knee is flexed nearly to a right angle, the anterior surface and edges of the condyles are very prominent, and the patella lies below, leaving a deep sulcus above it, between the condyles, occupied only by skin and cellular tissue; the skin is rather closely bound to the condyles so that it does not move upward as freely as the patella. The patella can be raised from the condyles, and the finger passed between it and them from above to the distance of nearly an inch by pushing the skin before it. The quadriceps is atrophied to such an extent that the femur seems almost subcutaneous in front. The power of active extension is entirely lost. Even when the leg is hanging straight down, with the knee slightly flexed, the foot cannot be moved forward in the least except by swinging it.

Right knee. Still somewhat swollen, and the soft parts indurated. The patient says that its appearance before the suppuration in January last was almost exactly the same as that of the left knee. The quadriceps is not so completely atrophied as the left, and the patient says the right has been the better limb of the two.

He walks now with one crutch, taking short steps.

Dr. R. F. Weir said that he had just finished treating such an injury in a very heavy man who tumbled in the usual way without striking his knee, but the rupture was different from that illustrated in Dr. Stimson's case. He had met with two varieties of rupture; one where the tendon is torn entirely across, and the other where only the central portion is ruptured. In his recent case the central portion was involved, and by drawing the muscle down by straps of rubber adhesive plaster, and immobilizing the joint, he was

able to get a very good result—that is, the patient was able to throw the leg forward and go upstairs without difficulty. He had seen, however, a few years ago, one case in a woman, where the tendon was apparently divided completely across, but there was some power of extension, showing that it was not entirely separated.

In cases of ruptured quadriceps, attempt has been made to reunite the parts by sutures under antiseptic precautions, but the results have not been sufficiently encouraging to warrant repeating the operation. Better results and greater security had been obtained by immobilizing the joint with the posterior splint.

Dr. Yale had seen a case in which the tendon had been torn, and the patella dislocated laterally by the limb being caught between a cask and the side of a house. The use of the limb was impaired as long as the gentleman lived. The patella, however, made for itself a new point of adhesion at the side of the joint, and the condyles were exposed by so much as the patella had been displaced by the dislocation.

Dr. Poore remarked that he had already reported a case to the society, in which rupture of the quadriceps had taken place, and the separation was four inches, which was finally reduced to about three inches. The rupture was complete. The ultimate result was that the patient has perfect use of the limb; flexing and extending it, and walking without a limp.

EPITHELIOMA OF THE EYE-LIDS, NOSTRIL AND SIDE OF THE FACE.

Dr. Gerster presented a patient sixty-four years old, illustrating the final result of the removal of an extensive epithelial cancer which had its commencement at the outer canthus of the right eye. The disease had gradually, in the course of several years, involved the upper and lower eye lids, the entire conjunctiva, a considerable portion of the superior maxilla, the cheek and the right nostril. When the patient first came under his observation in September, 1881, Dr. Gerster, with a great deal of difficulty, succeeded in exposing the eye, and found the cornea ulcerated, and in part covered with cicatricial tissue. The patient was entirely unable to move the eye-ball, and Dr. Gerster suspected involvement of the orbital tissue and fat. The patient insisted on getting rid of this offensive ulcerating

mass, and when Dr. Gerster had made the necessary incisions, he found that the tissues occupying the posterior portions of the orbit were not involved at all. The case, therefore, was not so hopeless as it seemed to be before the orbit was opened. The eye, all the orbital fat, a portion of the superior maxilla, of the skin of the cheek and forehead, both eye-lids, and a portion of the right nostril were removed. The defect following the operation was enormous, and it was very incompletely repaired by the process of cicatrization and contraction; finally, in January, 1882, he proposed a plastic operation with a view to remedying, as far as possible the disfigurement. To do this, he raised two large flaps from the forehead, using one for the formation of the lower eyelid and cheek, and the other for the formation of the right nostril. He cut both flaps intentionally in an oblique direction, in order to make them as long as possible. A small part of the flap out of which the nostril was formed, sloughed on account of the pressure of the adhesive plaster plug placed in the newly formed nostril, which, however, looked very satisfactory.

Having obtained union of the two flaps, he still had considerable redundant pedicle. The redundant part of the pedicle used for the nostril was separated three weeks after the former operation, and being attached by sutures to the skin of the forehead, served to form an upper eye-lid. This subsequently was drawn deep into the orbit, thus forming a sort of a lining of the roof of the cavity, and the cicatricial traction thus exerted, had the effect of smoothing off the unseemly protuberance caused by the rotation of the pedicle. The redundant tissue of the other flap was also cut away and put back into the defect caused by its original removal, where it helped to hasten the final healing of the wound. The ghastly deformity having thus been reduced to a small granulating space occupying the apex of the orbit, the patient is enabled to get along well with the aid of a small bit of black silk placed over the orbit as a protector. No relapse has appeared so far.

WOUND OF THE INTERNAL JUGULAR VEIN—LIGATION, EXCISION,
RECOVERY.

Dr. T. M. Markoe, presented a glandular tumor which merely served as a text for the recital of the history of the

case in which an operation was performed for its removal. The case was one of lymphoma of moderate size occurring at about the middle of the left side of the neck in the chain of lymphatic glands behind the sterno-mastoid muscle. He made his incision so as to reach the tumor behind the sterno-mastoid, and partly cutting and partly enucleating, without much difficulty reached the deeper portion of the tumor, but when this point was reached it was found that the growth projected forward and beneath the sterno-mastoid muscle, and he was obliged to draw the entire mass backward and outward in order to effect its removal ; in so doing it became very difficult to be certain as to exactly what he saw and what was divided. In separating the attachments of the base of the growth, when the tumor was nearly separated, he was suddenly shocked by the occurrence of a hæmorrhage which was something terrific. It was evidently venous blood, and was pouring out in a stream as large as his little finger from the bottom of the wound. Instantly he plugged the wound with sponges, and then the difficulty was to get at the bleeding point which evidently was either the jugular vein or some other vein of large size. For one moment he heard a hissing sound, but he was not certain whether it was actually due to the entrance of air into the vein or not. After a little time, constant pressure upon the bleeding point being continued, he carefully and slowly withdrew the sponge, constant pressure also being maintained both above and below, and was able after several trials, during which, much blood was lost, with the forceps to catch first the anterior source of the hæmorrhage, and passed a ligature about it. Bleeding from this point was arrested permanently and perfectly. Then the posterior and deepest portion of the wound was dealt with in the same way, and he finally caught a large portion of tissue including the bleeding point, threw a ligature about it, and the hæmorrhage ceased. When this had been done, he found that the point from which the hæmorrhage came, was just above the bifurcation of the common carotid artery, and the bleeding was evidently from where the lingual and superior thyroid veins unite, and empty into the jugular vein, which vessels he had tied. The other ligature was found to be on the side of the internal jugular vein. It was tied firmly, but he felt unwilling, and so he had always felt, to leave a lateral ligature on the

jugular vein. He therefore dissected the parts carefully, exposed perfectly and clearly the vessel, put a ligature around it, above and below, and cut away a piece between, partly to release the tension, and partly because he wished to see the lumen of the vessel, in order to be sure of what had been done. The points of the severed vein were now at least two inches distant from each other. The wound was left open to heal by granulation. The progress of the case was most favorable, and the patient is now perfectly well, no unfavorable symptom having developed, no local hæmorrhage having occurred. Dr. S. W. Gross had collected the largest number of cases of ligation of veins, and had recorded fatal results in twenty-two out of one hundred cases, the fatal results being largely due to phlebitis and septicæmia. Of these twenty-two cases, in five the patients died of secondary hæmorrhage, and it was a singular fact that in every one of these five cases the ligature had been applied to the side of the vessel. No death had occurred from secondary hæmorrhage, in any case included in his tables, from ligation of the vein in continuity or at its cut extremity. Dr. Markoe believed that the proper plan to pursue was to throw a ligature completely around the vessel, and to leave the wound open to heal by granulation.

EDITORIAL DEPARTMENT.

THE THIRD VOLUME OF THE INTERNATIONAL ENCYCLOPÆDIA OF SURGERY.¹

This third volume of the Surgical Encyclopædia now in process of publication by William Wood & Co., under the editorship of Prof. Ashhurst, has appeared with sufficient promptness to create expectations of the completion of the whole work within the next two years. For a work of the magnitude in which this has been projected, the original hopes of the publishers, that each succeeding part should appear at intervals of about three months, could hardly be realized. That the intervals have been extended in each case thus far to six months will have disappointed no one. Indeed, to the reader who desires to familiarize himself with the contents of each volume before it is succeeded by another, this lengthening of the interval between the arrival of the different volumes will not be unwelcome. We cannot but think, too, that the quality of the work is being improved by this same more leisurely pace. We have had occasion to notice, in the previous volumes, that they contained articles which were simply republications of previous articles on the same subject by the same writers. That this should have been allowed, perhaps grew out of a desire to hasten the appearance of the volumes. It is less likely that anything of this kind will be seen in the later volumes of the work. We detect nothing of the kind in the present volume, but, on the contrary, the various articles show evidences of special research and effort to fit them for the particular place in which we find them.

In this volume there is included the treatises on Injuries and Diseases of the Lymphatics, and of Muscles, Tendons and Fasciæ, which were crowded out of the second volume

¹ The International Encyclopædia of Surgery, a Systematic Treatise on the Theory and Practice of Surgery; by authors of various nations. Edited by John Ashhurst, Jr., M.D., Professor of Clinical Surgery in the University of Pennsylvania. Vol. III. New York: William Wood & Co., 1883.

The original plan of the work has also been departed from by leaving, for the succeeding volume, the treatises on the Injuries and Diseases of Bones, borrowing in return, however, from that volume the treatise on Injuries of Joints, and Dislocations. This volume is devoted chiefly to the surgery of the blood vessels. The short articles on other topics, which precede and follow those on the blood vessels, serve as a framework or setting to the latter, which occupy three-fourths of the bulk of the volume.

Our national pride is gratified by seeing that the treatise on Surgical Diseases of the Vascular System is by an American author. Whatever our regret may be that the eminent British surgeon, who was announced to contribute this article, was prevented from fulfilling his purpose, it gives us pleasure to see with what thoroughness and ability the author, who finally assumed the task, has handled the subject.

The editor, in his preface, notices with becoming respect the death of Prof. Van Buren, who had contributed to the first volume. It is worthy of note, also, that almost simultaneously with the appearance of this third volume was announced the death of its chief contributor, Dr. J. A. Lidell. Each volume has thus already its memorial tablet. Van Buren, Hodgen and Lidell, each has left us, embalmed in this Encyclopædia, his latest and ripest work. LEWIS S. PILCHER.

INJURIES AND DISEASES OF THE MUSCLES, TENDONS AND FASCIÆ.¹

Beginning by a statement of the fact, that the muscular system, by reason of its protection by overlying structures, as well as by its inherent powers of resistance to morbid impressions, is much less liable to the occurrence of injury and disease than might naturally be expected, taking into consideration the number and size of the muscles and their exposed situation, the essayist passes over in rapid succession, functional derangements, traumatisms, organic changes resulting from primary disease of the muscular structure, syphilitic changes, and those recognized as the sequelæ of lesions of the central nervous system, tumors, etc. Injuries and diseases of tendons are passed over somewhat cursorily.

¹ Injuries and Diseases of the Muscles, Tendons and Fasciæ. By P. S. Conner, M.D., Professor of Anatomy and Clinical Surgery in the Medical College of Ohio, Cincinnati; Professor of Surgery in the Dartmouth Medical College.

Under the head of myalgia the author acknowledges the existence of rheumatic attacks of an inflammatory nature, but further on, under the head of rheumatic and gonorrhœal myositis, says that many cases of muscular rheumatism are rheumatic only in name. It has been the custom, for many years, to attribute to the influence of cold, and consequently to consider as rheumatic in character, cases of torticollis and lumbago, when as a matter of fact, in the vast majority of cases, a strain or traumatism of some sort, as our author observes, will be found to be the exciting cause.

We notice that our author, in describing the process of repair in tendons after division of the same, states that the connective tissue new formation, or callus, developed between the ends of the divided tendon undergoes subsequent contraction. This is in opposition to the teachings of the greatest living authority upon this subject, Mr. William Adams, of London. This surgeon, as a result of his many experiments upon animals and operations upon the human subject has been led to observe that no such contraction takes place.

Favorable mention is made, we are glad to see, of the value of antiseptic methods in operations about the sheaths of tendons, in incising ganglia and in opening abscesses beneath the palmar fascia.

The essay ends with a description of that important and frequent distortion known as "Dupuytren's finger contraction." For this subcutaneous division is thought preferable to the operation of Busch; these being the only two operations which latterly seem to have been entertained by surgeons for the relief of this condition. GEORGE R. FOWLER.

INJURIES OF BLOOD VESSELS.¹

In undertaking this treatise, Dr. Lidell has been thoroughly imbued with the importance of his subject, and has been stimulated to an effort to treat it exhaustively. He has successfully considered surgical hæmorrhage and its treatment, wounds of arteries, wounds of veins, traumatic aneurisms, arterio-venous wounds, gangrene from arterial and venous occlusion, hæmophilia, intermediary, secondary and parenchymatous hæmorrhage, and concludes his treatise by taking up the surgical anatomy of all the principal arteries, and the

¹ By John A. Lidell, A.M., M.D., Late Surgeon to Bellevue Hospital; also Late Surgeon United States Volunteers, etc.

operative technique for the ligation of each. The key to the author's plan is to be found in one of his early paragraphs in which he says: "Notwithstanding the importance of shock, hæmorrhage is the most serious of all the complications attending wounds in general. More lives are lost from it, either directly or indirectly, than from all the other consequences combined that flow from such injuries. Of the slain in battle during our War of the Rebellion, I can testify from personal observation that a very large share, about one-half I think, but possibly even more than that, perished by hæmorrhage from wounds of the large blood vessels of the neck, chest, abdomen, groin, etc., or from wounds involving vital organs like the brain and lungs, the bleeding whereof caused deadly compression of these organs before succor could be afforded. * * * * By special training and fore-thinking the surgeon may acquire self-reliance to witness any hæmorrhage without dismay, and to look on the open mouths of any arteries with complete self-possession. * * * * The surgeon's fore-thinking should consist largely in scrutinizing the reported cases of hæmorrhage in all regions of the body, in ascertaining the causes of success or failure, and in considering them with a view to devise, if possible, better plans of treatment; for reported cases of hæmorrhage are, in reality, accounts of accidents which are liable to occur again." He then quotes the observation of the surgical historian of the War of the Rebellion, the late Dr. Otis, that "it is hardly possible to unduly multiply illustrations of the management of wounded blood vessels" with approval, signifying thus the character of the method which he himself proposes to adopt in the pages to come. Further reading of the treatise shows that its style is discursive and illustrative. The practical points of treatment are enforced over and over again, and the number of illustrative cases that are quoted is often so great that if the reader had not been mollified by the author's statement of his ideal method at the outset, he would be tempted to criticise them as unduly multiplied. The Surgical History of the War of the Rebellion has furnished an inexhaustible fund of illustrative material in this department of surgery, from which the author has copiously drawn. It is impracticable here to enter into a detailed examination of the manner in which each subject is treated. One point, however, we cannot help remarking

upon, especially in view of the evident intention of the author to omit nothing which would promise to be of value to the surgeon in dealing with bleeding vessels. To some devices he gives an amount of space and prominence which many would think unnecessary. Thus to the ingenious little instrument of Dr. Speir, the "artery-constrictor," he gives much space and many cuts, and to the fanciful and curious procedure of Weber, termed "Aertiversion" he gives almost as much prominence, while the subject of acupressure, familiarity with the methods of which may be of the greatest importance in emergencies in which those surgeons who are away from cities may find themselves placed, is dismissed with the briefest kind of a notice, concluding with the remark that Esmarch makes no mention of it in his Handbook, which omission the author pronounces to have been quite right, since, in his opinion, it is not of much value as a hæmostatic measure. The subject of the closure of arteries by torsion is also very briefly alluded to. The use of catch compression forceps for the immediate seizure of bleeding vessels, which has been systematized and developed by Kœberlé, Péan, Verneuil and Spencer Wells, and which according to the reviewer's experience and observation is of the greatest value in the ease and certainty with which a surgeon is enabled to control hæmorrhage, is merely hinted at in a brief sentence of two lines. As the text stands, of course we respect it as the expression of the opinion of the author in these matters, but these omissions detract from its completeness as a monograph on the control of surgical hæmorrhage. A considerable space is devoted to the consideration of wounds of veins, but by no means any more than the importance of the subject demands as will be abundantly evident after a perusal of what the author gives under this head. As he says, complaints are justly made, that this topic receives scant notice in some works on surgery. This portion of his treatise, although we do not find ourselves able to agree with all its views, we esteem as one of the most valuable parts of the whole effort.

LEWIS S. PILCHER.

SURGICAL DISEASES OF THE VASCULAR SYSTEM.¹

The most striking feature of Dr. Wyeth's article is the prominence given to the normal and pathological histology

¹ By John A. Wyeth, M.D., Professor of Surgery in the New York Polyclinic; Surgeon to Mt. Sinai Hospital, New York.

of the vascular system. The author has evidently expended much time and thought not only on the literature of the subject, but also in original work and experimentation. The article begins with phlebitis, two divisions being made. First, idiopathic, including gouty and syphilitic phlebitis, and the form caused by neither of these constitutional conditions ; and second, traumatic phlebitis.

Arteritis is next considered, and the fact is recognized that while the process of inflammation may, in its inception, be limited to a single one of the three coats, yet, by extension, the process involves them all. After a very complete account of the latest facts regarding the normal histology of arteritis, the etiological division of arteritis is adopted. The variety due to traumatism includes many cases commonly classed as idiopathic, such as are due to the impinging force of the blood stream during violent exercise and lodgment of endocardial vegetations. The non-traumatic class embraces atheroma and calcification and arteritis due to syphilis, the rheumatic and nephritic varieties being properly relegated to medical practice. Then follows the consideration of arterial thrombosis and embolism. Some statements are made in this connection at variance with the majority of writers.

"The perfect type of thrombosis from acute, traumatic arteritis is found after the application of an occluding ligature around an artery. By reason of arrest of the blood-current and disturbance of the equilibrium normally existing between the blood and the containing vessels coagulation takes place. * * * Immediately following the injury to the vessel the process of inflammation—true arteritis—commences. The tension of the ligature to such a degree as to divide the inner or middle coat, or both, is unnecessary. I have tied arteries (carotid and subclavian) in human beings, and in horses and dogs, and have specimens which demonstrate successful occlusion of the vessel without division of either of those tunics. Scarpa advanced the idea years ago, but surgeons generally have decried it. None the less is it true, and I am fully convinced, by experience, that it is safer than the division of one or two coats of a vessel by tightly drawing a narrow, cutting ligature around an artery" (p. 351).

Vascular tumors are next noticed, and in connection with cirroid aneurism, the author gives a table and analysis of cases in which the common carotid artery has been tied for

that affection, not including pulsating tumors of the orbit. Angeiomata, varicose veins and moles close a highly-creditable article which in pathology is advanced, and in surgical therapeutics conservative.

G. R. BUTLER.

ANEURISM.¹

Mr. Barwell's wide experience and scientific acquirements lead us to expect an interesting and instructive article, and the anticipation is fulfilled. Exceedingly systematic and logical in arrangement, minute pathology and accurate diagnosis are made, as they should be, the handmaids of therapeutics.

Regarding etiology, stress is laid mainly upon atheroma, endarteritis and alcoholism, not excluding other and occasional causes, as wounds, muscular effort and tight clothing. Syphilis, in contravention of the usual theory, he does not accept as a factor in the production of aneurism, supporting his view by the pathological facts that syphilis affects, mainly, the smaller vessels where aneurism does not occur, and that it tends rather to produce stenosis than dilatation of the lumen.

The general treatment of aneurism is fully discussed in both its medical and surgical aspects. The author looks with favor upon the method of Valsalva, and is of the opinion that a suitable and perhaps a reiterated venesection at the beginning of treatment would be highly beneficial. Among drugs, the iodide of potassium, which is in much favor in this country, is condemned unequivocally, except in those cases where syphilis coexists.

Under surgical treatment a number of measures are considered, the actual cautery, coagulating fluids, introduction of wire and horsehair, galvano-puncture and parenchymatous injection of ergotine. The author evidently does not look with great favor upon these methods, except the last, which is considered useful in selected cases. He enters with zest upon, undeniably, the most successful methods, namely, those which act by mitigating or suppressing circulation through the affected vessels. These comprise all the varieties and modifications of compression and deligation.

Mr. Barwell has here given an admirable résumé of the indications for and against the different varieties of operative

¹ By Richard Barwell, F.R.C.S., Surgeon to Charing Cross Hospital, London.

procedure, the complications and difficulties that may arise during and after operation, and their treatment.

The remainder of the treatise deals with aneurisms affecting the different arteries of the body, going into minute details of diagnosis and treatment suitable for the locality of the disease. A sufficient number of cases are quoted for purposes of comparison or illustration, and the author shows a commendable frankness in acknowledging his own rare mistakes in diagnosis.

The article, as a whole, is characterized by a pleasantly, dignified and courteous style, and an absence of heated partisanship which will make it acceptable reading even to the author's opponents. As to matter, it is marked by a German solidity and thoroughness, without the baffling sense of obscurity and involvement which frequently attends the literature of the latter nationality.

G. R. BUTLER.

INJURIES AND DISEASES OF NERVES¹

Are treated by Prof. Nicaise, of Paris, in a chapter of nearly one hundred pages. There are successively considered traumatic lesions ; inflammatory lesions ; neuralgia ; tumors, including painful subcutaneous tubercle ; tetanus ; and operations on nerves. The affections of only the spinal nerves are discussed, the ailments of the cranial nerves being left to the department of regional surgery. In connection with the subject of traumatism, there is given a description of the process of repair after wounds, and of the functional and trophic disturbances secondary to injuries of these organs. The portion of the article devoted to the operations which are practiced upon nerves will be the most interesting to surgeons ; while the general practitioner will be attracted to the fourteen pages on tetanus. The author places a great deal of reliance, in treating this disease, upon full doses of chloral, but does not neglect other means, such as the removal of causes of irritation from the wound, and, in proper cases, amputation, neurotomy, and nerve-elongation.

In all parts of the essay are abundant evidences of great familiarity with the literature of the subject. It is gratifying to us Americans to observe the frequent and respectful acknowledgment of the contributions of our countrymen,

¹ By M. Nicaise, M.D., Professor "Agrége," in the faculty of medicine of Paris ; surgeon to the hospitals, Paris. (Translated by J. H. C. Simes, M.D., of Philadelphia).

Mitchell, Morehouse and Keen, to this department of surgical science. The article, while elaborate and profound, is clearly written, and it has been so well rendered into English by Dr. J. H. C. Simes, of Philadelphia, that nobody would suspect it to be a translation.

F. H. GERRISH.

INJURIES OF THE JOINTS.¹

Setting out with the statement that joint injuries derive their great importance from the complex structure of joints, and the presence of synovial cavities, the exposure of which to the air causes them to become reservoirs filled with putrid secretions which both poison the whole system and produce local death of the bones, the author at once indubitably stamps himself as an exponent of what is most recent, as well as best in modern surgery. No one can read what this popular teacher has written without very decided advantage to himself; and no one can go far astray towards any injury to his patients, if his rule and practice is founded upon the precepts of this eminently practical surgeon.

In giving his own views of the treatment of dislocations, the essayist deprecates the disuse into which the mechanical contrivance, known as Jarvis' adjuster, has fallen. Probably very few surgeons now living ever saw one of these machines in actual operation, and it is not at all likely that one of them could be obtained of the dealers in surgeons' supplies, should one desire to make use of it.

From the consideration of the general principles governing the care of dislocated joints, the author passes to special dislocations, and in a clear and succinct manner discusses the symptoms and indications to be met in each. He very sensibly recommends, in the case of a dislocation backwards of the sternal end of the clavicle resisting ordinary methods of reduction, to cut down to the bone, and, grasping the sternal extremity of the bone with strong forceps, while assistants draw the shoulder outwards and backwards, force the bone into proper position. Under ordinary circumstances, and with antiseptic precautions, no special risk would be run in resorting to this operation in selected cases.

In differentiating between dislocations of the shoulder-joint and fractures in that neighborhood, the statement is

¹ By Edmund Andrews, M.D., LL.D., Professor of Clinical Surgery in the Chicago Medical College; Surgeon to Mercy Hospital, Chicago.

made that there is generally no spontaneous tendency to relaxation. This, perhaps, will not accord with the experience of most surgeons, for one of the most common annoyances, after the reduction of a dislocation of the shoulder-joint, is the difficulty in keeping the parts in their natural position. The head of the bone is liable to fall down into the axilla, whatever the character of the luxation in the first instance. True there may be no immediate tendency to relaxation, but it is certain that a recurrence of the accident may take place, and perhaps at once. In old dislocations of the humerus the use of the compound pulleys is deprecated as being least valuable and most dangerous of all appliances used for the purpose. Jarvis' adjuster seems to have served most excellently in this class of generally conceded hopeless cases. In dislocation of the hip likewise, when the method of reduction by manipulation, known generally as Reed's, fails, Jarvis' adjuster, or an extemporized substitute made from a bed-slat, a jack-towel and a bed-cord is recommended, and the use of the pulleys again condemned. In ancient dislocations of the hip-joint subcutaneous division of the structures resisting reduction is advised; and the author makes no mistake when he says that such operations upon the larger joints, without antiseptic precautions, should not for a moment be thought of. There is a tendency to favor the attempt to save a limb, the subject of a compound dislocation of the knee-joint. This is based upon the advantages offered by the use of free drainage and antiseptic dressings. A rational and reasonable treatment of incised wounds of joints is advised upon similar grounds. A very praiseworthy attempt is made to inculcate the principles underlying antiseptic surgery, rather than to formulate special methods.

The essay ends by a very carefully compiled review of the present state of our knowledge regarding gunshot wounds of joints, together with the results of experience on the part of the author in military life. The deductions drawn therefrom are of a character to commend themselves to the minds of most surgeons as sound doctrine. **GEORGE R. FOWLER.**

THE FORMATION OF THE TUNICA VAGINALIS,
THE DESCENT OF THE TESTES AND THEIR
RELATION TO OBLIQUE INGUINAL
HERNIA, AND HYDROCELE.¹

By OSCAR H. ALLIS, M.D.,

OF PHILADELPHIA,

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COLLEGE HOSPITAL ; AND LECTURER ON ORTHOPÆDIC SURGERY
AND JOINT DISEASES IN THE POST-GRADUATE COURSE IN
JEFFERSON MEDICAL COLLEGE.

I RECALL no part of my early anatomical studies that presented greater perplexities than the subject of the Descent of the Testes and their Relation to Oblique Inguinal Hernia, and I venture to add that few physicians leave their Alma Mater with a conception full and comprehensive of the relationship between these distinct, but closely allied subjects. I regret that I have no new and conclusive experiments to relate, but feel that old facts in new forms are often both interesting and instructive.

I will first ask your attention to the inguinal canal. With the student this canal has no existence prior to the descent of the testis, and yet the fact is clearly stated in standard works on anatomy. The intelligent student will state that the spermatic cord lies in and passes through the inguinal canal ; but if you ask him what occupied the canal before the descent of the testis, he is at loss for an answer, and yet it is clearly recorded that the *gubernaculum testis* passes from the testis through the inguinal canal to the bottom of the

¹ Read before the Philadelphia County Medical Society.

scrotum before the descent. Thus it is that we are brought to the knowledge of the fact that the inguinal canal is *created prior to the descent of the testis*. I shall begin this description by calling attention to the gubernaculum, since this structure plays an important part not only in the formation

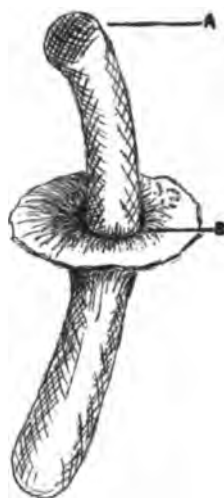


FIG. 1.

Diagrammatic. — *A*, testis; *B*, transversalis fascia. The substance between *A* and *B*, the gubernaculum which extends to the bottom of the sac. The opening in the fascia at *B* and the prolongation of the fascia over the gubernaculum is represented as funnel-shaped. This is the infundibuliform process of the transversalis fascia. The large size of the gubernaculum is designed to represent how the inguinal canal, moulded as it were over this, becomes large enough to admit of the passage of the testicle. The internal inguinal ring is formed in this fascia. *B* points to it.

tion of the inguinal canal, but also in the migratory process of the testes.

In the early stage of foetal development there may be seen, passing from the testis, which lies in the region of the kidneys, a structure, cord-like in appearance and somewhat thicker in diameter than the testis, which directs its course to the inguinal canal, and may, from this, be traced along it to the bottom of the scrotum (Fig. 1). In the female an analogous structure, the round ligament passes from the uterus through the inguinal canal to the labium major.

This structure, the gubernaculum, is prior to, and at the time of the descent of the testis of greater diameter than that of the testis, and hence the inguinal canal, which was created around the gubernaculum and of necessity of greater diameter than it, will be of ample proportions when the migration of the testis shall take place. The covering throughout the inguinal canal and scrotum most immediate to the gubernaculum is derived from the fascia of the transversalis muscle. It may be represented as woven like a purse over the contained structure. Two or three points

that occasion the student, in his studies upon hernia, great perplexity, may readily be cleared up here. It will be noticed in the adjoining figure (Fig. 1) that the fascia is represented somewhat funnel-shaped—*i. e.*, turned in like a funnel. This is the identical fascia that, in the description of hernia, is spoken of as the *infundibuliform process of the transversalis fascia*, and later in the progress of development, when the testis lies in the scrotum and the spermatic cord occupies the inguinal canal, this covering is called, by some authors, the internal spermatic fascia, or fascia propria. These long strange names give rise to much unnecessary embarrassment since they are designed to describe one and the same fascia, whose first function is to enclose the gubernaculum.

Still another point should be associated with this covering—and that is the name given to the opening or entrance of the inguinal canal. This is called a ring—the internal abdominal ring. This ring has no special importance except in the study of hernia. It should be remembered, however, that this ring (which can be readily seen and demonstrated before the descent of the testicle) is formed in and from the *fascia* of the muscle—that its size is ample for its natural contents, but that when a knuckle of bowel is forced into it, it cannot readily dilate, and hence forms a ring or constricting band that may prove hurtful or speedily fatal.

The next outer covering of the inguinal canal is formed from the muscular substance of the internal oblique. It takes the shape of the inner coat already described, and is purse-like in appearance. It is the only one of the three coats that is muscular. Its fibres descend from the muscle, form loops and rise again to be inserted with the general tendon. By this arrangement they are able to suspend the testes as in a sling, and when irritated as in

inflammation of the testis or cord, in peritonitis or nephritis, are capable of raising the testis to the external ring. There is no ring described in this muscle simply, as by its nature being muscular, it can offer no constriction to a hernial protrusion should one occur.

The last covering to be described in this connection is derived from the external oblique muscle. Owing to the presence of the gubernaculum in the inguinal canal—the



FIG. 2.

Diagrammatic.—The split in the fascia or tendon of the external oblique muscle is exaggerated to show that this portion of the inguinal canal will offer no barrier to the descent—that the presence of the gubernaculum was the efficient cause of its large size—and that the external ring and the external spermatic fascia are of a different character from and wholly independent of the tendon of the muscle.

fibres of the tendon of the external oblique muscle split (Fig. 2), and are widely separated in the inguinal region. This split extends from near the anterior superior spine of the ilium to the pubes. It is widest at the lower portion, where it transmits the gubernaculum—and where the spermatic cord is destined to lie. To prevent these fibres from separating, and thus opposing no barrier to intra-abdominal pressure, or from approximating and thus pinching the contents of the inguinal canal, there is a strong fabric woven between the fibres of this tendon—which cross fibres are especially firm and useful between the borders

of this split. Now the covering to be described is not derived from the muscle or its tendon—but from the fibres

that fill up this gap—and as the borders of this split in the tendon are known as columns, this covering receives the name of the intercolumnar process of the external oblique fascia. It is also called when enumerating the coverings of the scrotum—the external spermatic fascia. All the coverings of the gubernaculum, spermatic cord, testis, and oblique inguinal hernia are identical except that derived from the peritoneum—a fact that I trust the accompanying figure (Fig. 3) and statements further on will make clear.¹

In the foregoing remarks I have confined myself to the inguinal canal, its coats, position and contents in their relation to the gubernaculum and before the descent of the peritoneum and testis. Let us now examine this process. If one is fortunate enough to get a fœtus just before the descent of the testis, he will be surprised to see how loosely it is retained by the peritoneum. This peritoneal attachment, technically known as the *mesorchium*, bears the same relation to the testis that the mesentery does to the



FIG. 3.

¹ Facts to be remembered in regard to the innermost coat, that derived from the Transversalis Fascia—are: I. That the process which follows down and envelopes the gubernaculum—i. e., the funnel-shaped process into which the gubernaculum disappears is called the infundibuliform process of the transversalis fascia—it is also called the fascia propria—and the internal spermatic fascia. Three names. The internal femoral ring is in this fascia, and is the opening that receives the gubernaculum. The spermatic cord will follow the testicle in its descent and occupy this ring and infundibuliform process.

II. The second outer coat is called the cremasteric. It is derived from the internal oblique muscle.

III. The outer coat—is derived from the fascia that fills the split (see Fig. 2), in the tendon of the external oblique muscle. It has two names, the intercolumnar fascia of the external oblique muscle—and the external spermatic fascia.

small intestine, and its length from the testicle (Fig. 4, *A*) to the entrance of the inguinal canal (*C*) is equal or greater than from *C* to the bottom of the scrotal pouch. It will thus be seen that it (the mesorchium) is amply long to permit the testis to reach to the bottom of the scrotal pouch.

It will be noticed in Fig. 4 that the *peritoneum is attached to the gubernaculum in its upper half—i. e., throughout its abdominal portion*—but that no part of the gubernaculum is covered by it in its lower half; in other words,



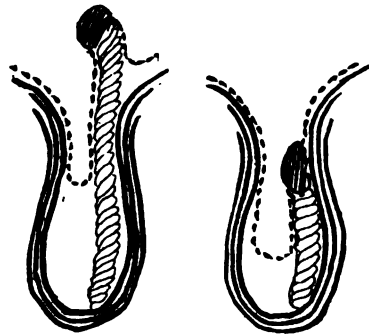
FIG. 4.

Diagrammatic.—The coil in this and in the two subsequent figures is designed to represent the gubernaculum—covered only in its abdominal portion by peritoneum—*C*, the entrance of the inguinal canal. The three dark lines are meant to represent the three coats of the inguinal canal—scrotum—and hernia, as they exist prior to the descent.

tention as facilitating its de-

the gubernaculum is in the early stages of development the sole occupant of the inguinal canal. There are among authors conflicting theories of the descent of the testes, but probably the oldest is that the gubernaculum, by its contractility, is the sole agent in the migratory process. Accepting this theory for a moment, let us see what must take place. As the gubernaculum shortens, the peritoneum attached to it must be the first to enter the

inguinal canal (Fig. 5); and when a little later the testis is drawn into the canal, it, the testis, will move upon a serous surface (Fig. 6), a circumstance to which Sappey



FIGS. 5 AND 6.

Diagrammatic.—Figs. 5 and 6 show how a shortening of the gubernaculum must convey the tunica vaginalis into the inguinal canal in advance of the testis. This representation illustrates how in undescended testis the tunica vaginalis may be present and hydrocele be possible.

scent. A little later the testis is landed at the bottom of the scrotal pouch already prepared for it (Fig. 7), after which the gubernaculum atrophies.

An homologous structure, the round ligament, exists in the female. It extends from the uterus, through the inguinal canal to the labium major; and, as in the case of the gubernaculum, *is covered by the peritoneum throughout its abdominal portion*. It has also muscular fibre in its composition. In the closing period of gestation a process of peritoneum is conveyed into the inguinal canal in a manner precisely analogous to the steps by which the tunica vaginalis is formed in the scrotum.

Many careful embryologists question the assertions that a direct agency is employed in effecting the descent, and state that all that is known about it is that it occurs through varied and complex agencies during the rapid development of the foetus. Granting that we know nothing positive about the *descent* in the male and the formation of the temporary serous lining in the inguinal canal of the female, still the anatomical facts of the existence in the embryo of the gubernaculum and round ligaments, and their presence in the inguinal canal can be turned to some account. Referring to the gubernaculum again we know its existence is ephemeral—that it is but scaffolding, to disappear when its function has been performed. It is not like the other parts about it destined for future use. While the rest of the body is rapidly developing, this is undergoing such changes as must soon leave no vestige of its former existence. Two diagrams may serve to illustrate how the gubernaculum

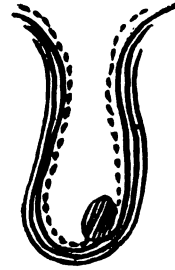
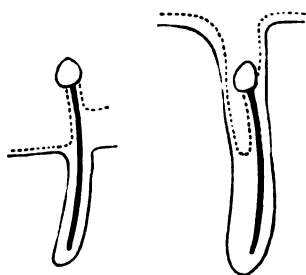


FIG. 7.

Diagrammatic—
Designed to represent the testicle fully within the scrotal pouch and the disappearance of the gubernaculum. The spermatic cord is not represented in this figure.

and round ligament may indirectly influence the structures that are attached to them. In the first (Fig. 8) I will represent the gubernaculum as one inch long—and the surrounding parts small and undeveloped. In the second (Fig. 9) I will present the gubernaculum of precisely the same length, but the corresponding parts much enlarged. This unequal development may, one would think, serve to convey the peritoneum into the inguinal canal in both sexes—and in the

male to be a factor in accomplishing the descent of the testis.



FIGS. 8 AND 9.

Diagrammatic.—In both figures the large black line is designed to represent the gubernaculum. It is of equal length in both. The figure to the right is represented at a later and more advanced stage of development, while in it the gubernaculum not growing is represented as the efficient, though indirect agent in accomplishing the descent of the testis.

In my remarks thus far, I have laid much stress upon the size and position of the gubernaculum, stating that its presence in the inguinal canal and scrotum was the cause of the large size of the canal; that its presence kept the canal patulous until after the descent of the testis. In the female there is a similar canal—a similar splitting in the external oblique muscle—but proportionally smaller as the round ligament in the fœtus is

smaller than the gubernaculum.

I have been careful to state that standard works on anatomy describe the gubernaculum as occupying the inguinal canal and extending to the bottom of the scrotum. If this is so, then the transversalis fascia must form its covering. In the *text* books the cremaster fibers are described as a part of the internal oblique—the middle coat of the inguinal canal—and extending upward into the abdominal cavity to be attached to the testes; and that in the descent there is an involution or turning in as the finger of

a glove, which gives to the cord and testis a covering of muscular loops, known as the cremaster. I object strongly to such a description; first, because it is a plain contradiction of statements elsewhere made by the same authors, that the inguinal canal encloses the gubernaculum before the descent, and no inguinal canal could exist if the middle coat were up in the abdomen. Again, the gubernaculum lies next beneath the peritoneum; hence, as it shortens, it must continue next to it. And finally, all place the cremaster, after the descent of the testis, outside of the transversalis fascia, a position impossible if the cremaster is attached to the testicle. The usual anatomical description of the descent of the cremaster and the formation of its loops, must be at loss to explain its presence when there has been non-descent of the testis, and yet I have dissected a hydrocele in an adult with undescended testicle with the cremasteric loops as distinct as in any old hernia.

If, however, the student is to understand that the coverings of the gubernaculum are created there to prepare for the future occupant, and that the gubernaculum is the efficient agent in conducting gradually, but effectively, the testes to their destination, then he will see no necessity for the involution of the cremaster; nor will he have difficulty in seeing how the tunica vaginalis is formed.

In closing this part of my subject, I wish to say that the testis, in its descent, pushes nothing before it; that it follows the gradually shortening gubernaculum, and that the peritoneum precedes the testis simply as a matter of necessity, it being attached to the gubernaculum nearer to the entrance of the inguinal canal (Figs. 4, 5, 6).

For a short time after the processes already described, the inguinal canal continues to have a serous lining—and three events are open to it.

1. It may remain permanently open (Fig. 10). In the male

a hernia following the serous canal would be styled congenital oblique inguinal, the bowel would descend into the sac of the tunica vaginalis, and in case of strangulation

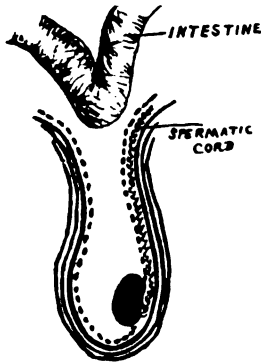


FIG. 10.

Diagrammatic.—The inguinal canal is purposely made very large for better representation. The spermatic cord will be seen to lie between the tunica vaginalis and the infundibuliform fascia of the transversalis. In this figure the whole length of the inguinal canal is lined with a serous membrane.

tunica vaginalis (Fig. 11). The spermatic cord becomes now the sole occupant of the inguinal canal in the male. Should a hernia now form and take the course of the canal, it must drive the peritoneum before it and form a new serous sac, within the canal and scrotum. A strangulation and operation in this case will not reveal the tunica vaginalis. The newly formed sac will separate the bowel from the cord. In the female after the serous lining has disappeared, a hernia following the canal must push a portion of the general peritoneum before it. In case of operation for strangulated hernia—the round ligament will not be exposed since it will lie behind the hernial sac.

and operation, the testis would be exposed. The cord in such a case would be separated from the bowel by the original peritoneum. In the female the hernia would also be styled congenital, oblique inguinal, and would descend into the labium major.

2. The serous surfaces in the inguinal canal may fuse, atrophy and disappear, leaving only a filamentous process to connect for a time the abdominal peritoneum with the tu-

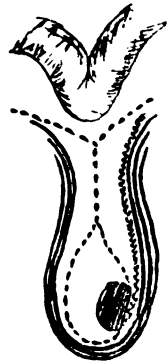


FIG. 11.

Diagrammatic.—Note that the spermatic cord in this figure is the sole occupant of the inguinal canal — after atrophy of the serous lining. Note the dimple in the abdominal peritoneum that usually exists after the fusion of the serous lining of the inguinal canal.

3. The process of peritoneum may close only at points, leaving portions along its course unaffected (Fig. 12). In such a case a hydrocele (in the male) may occur within the inguinal canal, or about the spermatic cord below the external ring, or in the tunica vaginalis. One or all of these are possible. Dropsy of the cord (encysted hydrocele) associated with that of the tunica vaginalis is not uncommon. I have never seen but one that I felt was confined to the inguinal canal. In the female similar cysts are possible.



FIG. 12.

Diagrammatic.

—Designed to illustrate how serous sacs may be rendered possible by the imperfect fusion of the serous lining of the inguinal canal.

Hydrocele of the tunica vaginalis with undescended testicle is also possible. I have dissected one. The manner in which it may be brought about will be seen by reference to Figs. 5 and 6, which represent the vaginal tunic preceding the descent of the testicle.

The shape of these sacs when distended with fluid will depend on their surroundings.

If below the external ring and above the tunica vaginalis, it is usually oblong. Collections in the tunica vaginalis usually assume a pyriform appearance. The reason of this is that this serous sac does not close abruptly immediately above the testicle, but, gradually narrows, like a funnel. The tunica vaginalis is pyriform (Fig. 13), as soon as the testicle is lodged in, and distends the bottom of the scrotum—it is pyriform in every stage of hydrocele—because



FIG. 13.

Diagrammatic.
—Designed to show the pear shape of the tunica vaginalis, after descent of testis.

when there are no adhesions or controlling influences, it can take no other shape. Hence the value of the shape in a diagnostic point of view.

After the descent of the testes, the spermatic cord is usually the sole occupant of the inguinal canal—and

when the testes are in a state of health or inactivity, the cord does not fill the canal. This undue size of the canal is to provide for periodic increase of the spermatic cord as well as for inflammatory processes. It is therefore obvious that the inguinal canal in the adult male, cannot present a sufficient barrier to the production of hernia—since a smaller canal would at times place the testicle in jeopardy. The real safe-guard against herniæ of all descriptions lies in the peritoneum—which acts as a hitching strap to the unstable intestine, and in most instances keeps it within safe limits. In some cases a hernia follows an attack of diarrhœa. This will be readily understood, when we recall the fact that the mesentery loosely surrounds the gut, and accommodates itself to it in its various



conditions. When, therefore, the bowel is distended as in the upper diagram of Fig. 14, the mesentery must be short—the reverse of which must exist when the bowel is empty.

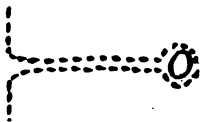


FIG. 14.

One other point I will state and close. The fact is often stated that men are more liable to inguinal, and females to femoral herniæ. This sexual determination of hernia depends wholly upon the

varying width of the pelvis in the two sexes. In both, the iliac vessels skirt the borders of the pelvis, to escape any pressure that might come from intra-pelvic enlargements—as a distended bladder, rectum or uterus. The iliac vessels in the female are more widely separated than in the male. This gives to females a large femoral canal—while at the same time the greater width of the pelvis gives a longer inguinal canal. This canal is not only longer in the female, but it is also smaller since it contains only the round ligament, a structure less vital

and changeable than the spermatic cord. The narrower pelvis of the male secures his immunity from femoral hernia—though at the same time it gives him a shorter inguinal canal, and when we consider that this canal is larger to accommodate the spermatic cord, we have valid reasons for the greater frequency of inguinal hernia in men.

ON SOME COMPOUND ARTICULAR FRACTURES.¹

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THE surgery of the joints has already received, in the discussions of this society, an attention to which the importance and variety of the lesions with which it deals, the permanent disabilities which these lesions so frequently cause, and the difficulties and embarrassments encountered in their treatment fully entitle it. Among the more important traumatic lesions, compound fractures hold a prominent place. Equally with other injuries they have shared in the benefits conferred by the recent great improvements in the treatment of wounds, and, so far as the severer forms are concerned, the rules of treatment have been drawn with sufficient distinctness. You will all, doubtless, remember cases that have been presented here in which formal primary excision of a joint that has been extensively mutilated in all its parts, has not only saved the limb, but has also given the patient a new and useful joint. My wish is to ask your attention this evening, not to these extensive

¹ Read before the New York Surgical Society May 8, 1883.

injuries in which the question lies between excision and amputation, but to those lesser ones in which the injury to the bone and soft parts being comparatively slight, the main feature is the implication of the joint, and the therapeutical problem is how best to avoid dangerous suppuration within it, cases in which the surgeon asks himself whether he is justified in striving for preservation of form and function, in seeking to convert the fracture into a simple one, in depending upon drainage and antiseptics to prevent suppuration, or whether he should not rather seek in partial or complete excision an inferior result, but one obtained with less risk to the patient. The cases which I have now to relate are those of the class which have come under my care during the past year; they are three in number, one each of the elbow, knee, and ankle.

CASE I.—W. J. K., twenty-eight years old, fell to the ground April 4, 1883, from the seat of a truck which he was driving, struck upon the palm of his right hand and injured his elbow. He went at once to a small hospital, where, he says, the limb was handled for some time, causing him much pain, and he was then advised by the examiners to seek relief elsewhere. He came to the Presbyterian Hospital, where I saw him five hours after the accident, and recognized a dislocation backward at the elbow of both bones of the forearm. Ether was administered, at his request, and the dislocation reduced easily. The skin was unbroken.

On further exploration, I found a movable, hard body about half an inch long, lying under the skin on the outer side of the joint between the head of the radius and the olecranon, which, as the outlines of the olecranon, external condyle, and the accessible portion of the head of the radius were normal, I judged to be the inner portion of the head of the radius broken off when the bone was forced backward past the condyle. Believing that if left in place, or even if

restored to its proper place if that were possible, it would interfere very seriously with the subsequent mobility of the joint, I removed it at once by cutting straight down upon it. The joint was then washed out with a watery solution of carbolic acid, 1 in 40, a short drainage tube inserted, the wound closed about it with two sutures, and a gauze dressing applied.

The fragment was a portion of the head of the radius, triangular in shape, comprising about one-third of the articular surface. It is 17 mm. long, 12 mm. wide, and 8 mm. thick, the latter measurement being in the direction of the longitudinal axis of the bone.

The patient's temperature, which reached 102° the first evening, sank steadily to 98.5° on the morning of the eighth day. The dressing was not changed until the third day, when the tube was removed, and again on the eighth day when the wound was found almost dry, and when I moved the joint through an arc of about 70° , rotated the wrist without causing pain, and reapplied the dressing. The patient left his bed shortly afterwards, without permission, and walked about for two hours. In the evening the joint became painful, the temperature rose to 100.75° , and the next morning to 103° , when I removed the dressing and found no discharge, but the outer side of the joint was tender on pressure, red and swollen. Reapplied dressing; posterior splint; ice-bag. Two days later (the eleventh day) the wound discharged about two drachms of pus on pressure, and during the following week discharged freely on pressure over the outer side of the elbow. On the nineteenth day I made a counter opening on the outer side of the arm about three inches above the wound, and on the twenty-fourth day opened a large subcutaneous abscess on the inner side of the elbow, which communicated with the other, apparently by a track passing around posteriorly above

the elbow. The flow of pus then diminished rapidly, and the opening closed within a month. As the joint was only slightly movable, I forced it under ether on June 8, getting motion through a range of about 60°. When I last saw the patient, a week or two later, the greater part of this gain had been lost; the joint was free from pain, and the patient resumed work as a driver, promising to report from time to time. I have heard nothing from him since.¹

CASE 2.—Edward C., twenty-two years old, was admitted to the Presbyterian Hospital February 4, 1883, with a compound fracture of the left patella, caused the same day by a fall from a pillar of the elevated railway, which he was attempting to climb while intoxicated. The bone was broken transversely a little below its centre, without comminution, and the fracture communicated largely with a clean-cut, transverse wound, one and a fourth inches long lying directly in front of it; the edges of the wound and the surrounding parts showed no signs of having been bruised. The trousers showed a corresponding transverse cut at the knee. There was also a fracture of the left inferior maxilla, and a long vertical wound of the left cheek. The knee was dressed with carbolized gauze, and the limb placed on a single inclined plane.

The next day, when I first saw the case, I found the wound and the interval between the fragments occupied by a clot, removed it, enlarged the wound for half an inch on the inner side, washed out the joint thoroughly with a 1 to 20 carbolic solution, passed a drainage tube into the joint on each side through an opening made at about the center of the lateral aspect, brought the fragments together with a silver-wire suture, the loop of which included all the soft parts except the skin in front, but not the articular cartil-

¹ I met this man again May 23. Flexion and extension at the elbow are almost complete; but rotation of the forearm is entirely lost. The arm is strong and serviceable.

age; brought the ends out through the incision, closed the wound with sutures, and applied a gauze dressing covered with cotton bound on firmly. Posterior straight splint.

The dressing was changed the next day because of pain, and not again until three days later, when pus was found to have formed under the skin on the outer side, rendering necessary a counter opening three inches above the one made for the drainage tube on that side. The patient's general condition was satisfactory; temperature 99.25. Three days later (February 12) the drainage tubes were removed, and a fresh one inserted on the inner side, under the skin above, to drain a small cavity which had formed around and above the tube. During the following week the dressing was changed every second or third day, and the patient seemed to be doing well, but his temperature rose every afternoon to 101°.

February 21.—Complained of pain on pressure in the lower part of the thigh, which was swollen and rather tense; there was, apparently, no liquid in the joint, the openings yielded only a small amount of thick, creamy pus on pressure.

February 24.—I opened a large collection of pus which lay on the outer side of the lower portion of the thigh under the vastus externus, and which communicated imperfectly with the opening made by the drainage tube on that side, and also with the outer angle of the wound. The incision made on this occasion, was about six inches above the condyle. Drainage tube. After this the temperature sank to the normal level, the thigh shrunk to nearly its natural size, and the amount of pus diminished steadily.

March 12.—It is noted that the case progressed satisfactorily during the preceding fortnight; the abscess on the outer side of the thigh had shrunk to the track of the tube, the last portion of which was removed that

day; the pouch on the inner side had a capacity of about one ounce; the transverse wound in front of the patella was flat and partly cicatrized. The wire uniting the fragments was cut and removed on that day. The patella was movable laterally, and the knee could be flexed slightly without pain.

March 30.—The dressing, which had been in place eleven days, was changed; all the openings except the two first made for the drainage tubes were closed, and the anterior wound had nearly cicatrized. The fragments of the patella were united apparently by a fibrous band about one-fourth of an inch long, and were movable upon each other.

The patient was discharged from the hospital April 2, with instructions to wear a posterior splint and report in a fortnight.

April 14.—Everything was found healed except the tube opening on the outer side. Patient walks without a crutch, and can flex the knee 10° without pain. Independent mobility of the fragments cannot be recognized.

April 30.—I removed a small fragment of the patella that was found under the skin just above the opening of the drainage tube on the outer side, and which had kept up suppuration at that point. The patella is freely movable laterally, and the mobility of the joint is increasing.

CASE 3.—Thomas S., forty-seven years old, was admitted to the Presbyterian Hospital February 17, 1883, with a compound fracture at the left ankle, caused by a fall while walking in the street half an hour before admission. Intoxicated.

The left fibula was broken at a point about three inches above the tip of its malleolus; the internal malleolus was broken off at its base, and this fracture communicated with

a transverse wound of the skin directly over it, through which blood was flowing quite freely. A small piece of bone which lay in the wound was removed. The surface of the wound was washed with the carbolic solution, but the wound was not injected. A gauze dressing was applied, with side splints outside. The next day the dressing, which was saturated with blood, was changed. The patient was very tremulous, with slight hallucinations. On the third day the dressings were again changed, the position of the foot corrected, a posterior and an external lateral splint of plaster of Paris applied next the skin, and a new dressing placed over all. This dressing remained in place until February 26, the tenth day, when the discharge came through. During the first days the temperature did not rise above 99° ; on the eighth day it rose to 99.5° , and on the tenth to 100° . The alcoholic symptoms had disappeared by the end of the first week.

March 5.—The wound was found to be reduced to a small flat sore, and a small cotton dressing was substituted for the gauze.

March 18.—The wound was found entirely healed; a continuous plaster splint was applied from the toes to the knee, and the patient was discharged March 24, at his request.

May 7.—I learned that the joint was freely movable and painless; the patient had returned to work and was troubled only by the swelling of the limb during the day.

While in the last case the course was entirely free from complications, and the result as satisfactory as after any simple fracture, and although in the other two the patients' lives were never in danger, and there was never even any anxiety concerning them, except such as is inseparable from a knowledge of the possibilities in such cases, yet in each recovery was delayed, the result marred, and the chance of the oc-

currence of dangerous complications notably increased by profuse and prolonged suppuration, and in each the course differed widely from the uneventful, uninterrupted, rapid progress to recovery seen in the third case, which is the ideal of treatment, and which many believe a rigorous use of the complete antiseptic method will insure.

It would be manifestly improper to assume that this difference in result was due solely to differences in the treatment of these cases; such a generalization from so limited a number of cases would be unwarranted; but a discussion of these differences may not be without value, and may bring out such details of experience and expressions of opinion by you as will enable us to formulate more closely rules of treatment to be applied in similar cases. The details of treatment and the differences were as follows:

In no case was the spray used; neither in the first nor in any subsequent dressing. At the first dressing the wound was injected with the carbolic solution in the first two cases; in the third case only the surface of the limb and wound was washed with the same solution. At no subsequent dressing was the wound in either case injected; at the most a sponge saturated with the solution was squeezed over it. The dressing was the common carbolized gauze applied dry in a single broad sheet of several thicknesses or in several narrow strips, overlapping and crossing each other somewhat like those of a Scultetus bandage, for the sake of an easier and more accurate fit, bound on snugly with a roller bandage, and sometimes overlaid with a thick layer of cotton to equalize the pressure. The dressing was changed whenever the discharge came through, or whenever pain or a rise of temperature made inspection of the wound desirable. The drainage tube in the first case was short, reaching probably down to the wound in the capsule, but not into the joint; it was removed on the third day. In the second

case, fracture of the patella, a drainage tube was passed into the joint on each side and left in place for a week. In the third no tube was used.

In the second and third cases the joint was kept completely immobilized upon a splint for several weeks; in the first case it was immobilized for one week and then, after the occurrence of suppuration, again until the cure was nearly complete.

There was no evidence of putrefaction of the discharge in either case; and in the two that suppurated, the drainage was efficient and the pus came, not from the joint, but from cavities that formed in the cellular tissue beneath the skin, and in one, beneath the vastus externus. Why did these collections form? Why did suppuration occur at points so distant from the openings in the skin?

In the first case there appears to be a very definite, immediate determining cause, the passive motion communicated on the eighth day, together with the use of the arm immediately afterwards in dressing and moving about. Up to this time the patient had been doing very well, the swelling had subsided, and the wound was little more than a superficial sore. The swelling that followed the receipt of the injury was not greater than that commonly observed immediately after a dislocation of the elbow, and the passive motion was even much less than that which is frequently communicated in the treatment of the same injury. There must, therefore, have been a secondary, contributing cause, and that second cause I am disposed to find in the adjoining, partly healed track of the drainage tube; the two acting upon the loose cellular tissue modified in its nutrition and irritated by the previous swelling.

In the patella case similar conditions existed; pus formed outside the joint and escaped alongside the drainage tubes; The later abscess, which formed under the vastus externus,

and required a separate opening, was a simple abscess by proximity or by direct continuation, such as is frequently seen.

The almost uninterrupted series of successes recently obtained in various arthrotomies done for the relief of deformity, specially in genu valgum, which are among the most brilliant triumphs of antiseptic surgery, shows that a compound articular fracture, produced by the surgeon with the minimum of violence and of injury to the surrounding soft parts, can be safely received and promptly repaired. In such cases, as also in those which have here been narrated, the joint is opened and a drainage tube is commonly used; the differences, therefore, to which I think we must look for an explanation of the difference in the results, lie in the greater injury done in the latter to the soft parts, to the swelling, and to the occasional delay in beginning treatment—a delay for which thorough disinfection does not entirely compensate.

Again, if we compare the course of simple dislocation of the elbow with that of the first case, the principal difference is found in the addition in the latter of an incision, the presence of a drainage tube for forty-eight hours, and the persistence for a few days of the unhealed track of that tube; and this difference was sufficient, with the aid of the slight irritation of motion, to provoke suppuration in the swollen tissues. The inference to be drawn is, I think, that the unbroken skin furnishes a protection for injured or irritated tissues for which antiseptic dressing and treatment are an uncertain substitute, and that we should be cautious in inferring that we can safely deal with such tissues in accordance with experience obtained in operations upon those that are uninjured and unirritated. There is reason to think that if this elbow had been kept at rest for a few days longer suppuration would not have taken place; but still,

would it not have been better to postpone the operation itself, to have removed the displaced fragment of the head of the radius only after the subsidence of the irritation caused by the dislocation?

Of these three cases the one that did best was the one that was least interfered with (it was also the one in which the injury was least, but the difference in this respect was not great enough, I think, to account for the difference in the results), and I find in this fact and in the fundamental success obtained in all, ground for the belief that confidence in modern methods of treating wounds should incline the surgeon rather towards absolute conservatism than towards operative interference; that in cleanliness, drainage, and rest we have agents efficient in themselves to avert inflammation of the joint, or, failing that, to keep the inflammation within such limits that the risks of an operation, if it should become necessary, are not materially increased; that the safeguards now possessed against the occurrence of formidable complications of wounds should give confidence to expect the comfortable healing of wounds accidentally inflicted, rather than stimulate to the voluntary creation of new ones; and that the broad rule of treatment in cases such as those under consideration should be to avoid excision except when it is clearly indicated by the extent of the injury, the difficulty of establishing drainage, or by an economical reason arising from the function of the joint involved and the social condition of the patient that may make mobility, even if combined with some insecurity, preferable to ankylosis.

A CASE OF ABSCESS OF THE LIVER TREATED BY INCISION AND DRAINAGE—RECOVERY.

By H. BANGA, M.D.,

OF CHICAGO, ILL.

DURING the absence of Dr. Ernst Schmidt, Attending Surgeon to the Michael Reese Hospital, I took charge of the following case :

M. G., æt. thirty, salesman, of Polish nationality, had been admitted to the ward for internal diseases on July 29, 1882, giving the following history of his present sickness.

In October, 1881, he complained of fever-chills coming on almost daily for twenty-two days. He felt all right after this until, in December, 1881, suddenly, one night, he again took sick with chill and sharp shooting pain in the right side. Every breath would increase the pain. No cough. After a few days the pains grew less, and for the two months following the patient was lingering on the sick bed with fever, occasional chills, loss of appetite, pain in the right side, and emaciation. No cough to speak of. He was under the care of several physicians who, however, disagreed as to the diagnosis, some pronouncing it a lung trouble, others pleurisy, still others hepatitis. As no medical treatment seemed to improve his condition, the patient went to Eureka Springs, Ark., where he passed three weeks; then went back to Kansas City, and thence to Excelsa Springs, Mo. His condition being still the same, he finally set out for Chicago to get into some hospital.

As regards the history of the case prior to the present sick-

ness, the patient says that his habits had always been more or less irregular, often drinking to excess. He has lived in the Southern and Southwestern States for the last twelve or fifteen years. At the age of twenty-two, he had intermittent fever, of which he recovered entirely. He has had venereal diseases of every variety at diverse times. Otherwise, the family record is very favorable. His parents are still living at an advanced age; some relatives that died, did so in very early or late life.

Status præsens. — Patient a dark complexioned, fairly nourished man, five feet eight inches high, weighing one hundred and twenty pounds; he has a waxy look, is very anæmic and slightly jaundiced. Pulse 108, soft, small; temperature 38.2°C .; respiration accelerated and superficial. Shortness of breath. Tongue furred. At the first glance a very prominent swelling is noticeable in the liver region. On percussion complete dullness begins, on the right side, at fourth rib extending in the mammary line to a point two inches below the costal cartilages. The epigastrium also protrudes remarkably, presenting perfect dullness on percussion as far down as the umbilicus. There is some slight tenderness on hard pressure, but no discoloration of the skin indicating circumscribed inflammation nor any fluctuation. The tumor, on the contrary, seems to be solid. On the left side every thing is normal. The right lung seems to be subjected to a certain compression but presents no signs of disease of the lung tissue.

Diagnosis.—*Abscess, probably suppurative hepatitis, perhaps empyæma. The presence of pus was confirmed on August 15, by exploration with the hypodermic syringe.*

The patient was chloroformed August 28, and a trocar inserted between the sixth and seventh rib a little outside of the mammary line. Thick pus rushed out with force, when the canula was removed at once, and an incision made

at the same spot. After the soft parts were cut through, about two quarts of greenish looking matter, almost odorless, ran out. Upon entering the incision with the right index finger, I found that I was in no cavity but that the liver—*i. e.*, a hard, solid body—was leaning against the chest walls, being attached to the latter by means of fine filaments which would easily break under the finger. I thought that the absence of an abscess cavity was due to the fact, that the matter had been gathering between liver and diaphragm, pushing the liver downward, the diaphragm upwards to the fourth rib. After the pus had been emptied, the liver resumed its natural position, the dullness on percussion keeping almost within normal limits. The mixture of greenish bile with the pus made me believe that the matter undoubtedly had originated in the liver, but had perforated between liver and diaphragm becoming circumscribed in some way or another towards the peritoneal cavity. A short drainage tube of large size was introduced to keep the wound open. Iodoform dressing. Temperature at time of the operation 37.2° ; 38.2° on fourth day, but afterwards fell below 38° . The discharge continued for about two weeks, and then ceased, the wound healing in an apparently healthy manner.

The general condition, however, did not improve. Soon after the operation the swelling was very much reduced, yet, after the wound began to close, the hypochondrium again protruded. The pain increased, the temperature rose, the patient felt weak and prostrated. On September 16 he was again put under the influence of the anæsthetic; a trocar was inserted at the edge of the costal cartilages in the mammary line; the pus spurted forth with great force, its very offensive odor at once revealing the danger in which the patient was. I withdrew the trocar and made an incision parallel with the costal cartilages in the mammary

line. After cutting through muscles and peritoneum a great quantity of pus ran out, yet not very freely. Upon entering with my finger, I again felt the liver right behind the incision; it was hard, and did not fluctuate. I then set retractors into the wound, pulling it wide apart, when I at once discovered my mistake. The pus continued to run out from the liver through the small hole left by the trocar, so that I had not yet opened, with my knife, the abscess proper. While I kept the wound open, Dr. Park, who kindly assisted me, put a blunt knife into the trocar hole and made a transverse incision into the liver about one inch long, which was still more dilated with the finger. Now the matter rushed forth in a stream, fully three quarts collecting in the basin. After the pus had ceased running we tried to insert a big drainage tube, but failed to get it in. On exploring with the index finger we found that the incision in the liver did not correspond any longer with the incision at the surface; that the former had slipped upward behind the ribs with the retracting liver. In our trials to introduce the tube we were at the lower surface of the liver—*i. e.*, in the peritoneal cavity. During these manipulations a part of the omentum had become prolapsed. We thought it best to cut off the protruding portion and not to replace the rest, but to leave it in the wound, as it had been bathed in pus. The drainage tube, which we finally inserted, measured eight inches. Lister dressing. Right after the operation the temperature became normal and continued so with slight oscillations up to the end. The abscess was washed out several times during the day with five per cent. carbolated water. The discharge continued very profusely for eight or ten days, then lost its offensive odor, when we substituted boracic acid solution for injections. The patient made a slow, yet, as it seemed, a perfect recovery. The drainage tube was removed on November 25. In the

middle of December the patient left for New Orleans. He felt somewhat bloated after a hearty meal. The dullness in the liver region begins a little above the sixth rib, and extends as far as the costal cartilages. There was a tympanitic tumor (hernia) as large as a walnut at the place of the incision, causing, however, no trouble at all.

There are some points in this case which I deem interesting enough to comment upon.

1. It is clear that the first operation failed to really open the abscess, because it escaped my notice that all the pus, running out through the incision, came from the opening made in the liver by the trocar. Or were there two separate abscesses present? We might believe this from the fact that the first incision healed so promptly.

2. There were no signs of inflammation of the skin indicating the way the pus intended to take to the surface. There was no fluctuation. The abscess was yet confined to the liver, as is shown by the absence of solid attachments to ribs or peritoneal cavity; for had it been fixed somewhere we would not understand how it could recede, as it really did, after the pus was discharged. In the usual run of such cases the suppurative inflammation extends to the skin, and renders the abdominal walls adherent to the viscus. It is just in this respect that the present case is exceptional.

3. It is worth while remarking how little bleeding followed the incision through the liver, although the knife penetrated almost an inch of its thickness.

4. It seems that the prolapse of the omentum protected the peritoneal cavity against the entrance of pus. The omentum was, apparently, so situated underneath the liver as to conduct the pus into the wound made through the abdominal wall.

5. The hernia is, undoubtedly, due to the transverse direction I gave the incision, thereby dividing some of the bundles

of the rectus abdominis. In selecting the spot for incision, I was guided by the assertion of the patient that he had the most pain at that place. I believe that the most tender spot is generally the one where an abscess, if left to itself, breaks spontaneously ; hence it always offers the shortest route to the knife of the surgeon.

6. It seems wonderful how that man could recover, eat and digest food after a large part of his liver had been destroyed. We might anticipate new trouble, of course, if the patient falls back on his old way of living irregularly and drinking to excess.

CASE OF HERNIA, WITH CYSTS UNIQUE IN CHARACTER ATTACHED TO WALL OF HERNIAL SAC.

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HOSPITAL, ETC.

WOODS, colored, æt. sixty, had been troubled with an old inguinal hernia of left side for years. On November 10, 1880, the hernia came down, and he was unable to reduce it. Symptoms of obstruction set in, with occasional vomiting. Dr. W. B. Nichols saw him and made efforts to reduce it, but failed. As the symptoms were not urgent, temporizing measures were adopted until November 14, when, the patient being no better, I was asked to see him.

I found that there had been no action of the bowels

for four days; that he suffered with paroxysms of pain, and had vomited occasionally.

The symptoms were still not urgent; no evidence of collapse; pulse good; no great tenderness about the tumor, nor was it very tense. It seemed to me I ought to succeed with the taxis in reducing it. I therefore proposed to give the patient an anæsthetic and attempt its reduction; but



FIG. 1. CYST OF HERNIAL SAC.

A, main cyst, nearly natural size; *B B*, mouths of smaller cysts, with broom-straws inserted.

failing in this, to proceed at once to operate. This was concurred in by Dr. Nichols, and acceded to by the patient.

Accordingly, after thoroughly anæsthetizing the patient, manipulation was carefully tried, but failed. There was something difficult to understand in the conditions.

It was clear there was no tension in the hernial sac,

yet there was a resistance, an elasticity, and a fluctuation that suggested a co-existing encysted hydrocele. Against this was the fact that in manipulating, the whole tumor seemed to be one continuous sac, and that no translucency appeared through the naturally dark scrotum. As there was no probability that there was a condition of the bowel demanding an opening of the sac, I determined to cut down and free the neck of the sac of all surrounding constriction and reduce, if possible, without opening it.

This was done, but the same difficulty presented itself. The contents could not be made to pass through the neck of the sac. I, therefore, opened the sac, when the bowel could be seen looking perfectly healthy, except at the more dependent portion, where it was traversed by a white band, which, for the moment, was supposed to be lymph. A touch showed that it rolled off the surface of the intestine, being entirely disconnected with it. It was puzzling. My left little finger was then introduced into the sac and carried in the direction of the neck, with a view of determining the cause of the difficulty in reduction.

The bowel immediately returned into the abdomen with the characteristic gurgle; my finger was then withdrawn, when there followed it a cyst, the size of a hen's egg (Fig. 1), with transparent contents and a pedicle the size of a large goose quill attached to the peritoneal surface of the inner wall—*i. e.*, the wall next to the pubis—of the hernial sac. The pedicle was tied and cut off, the wound carefully dressed, and the patient recovered without a bad symptom. The cyst, with the silk ligature about its pedicle, was placed in alcohol, and the bottle tightly stopped. Some time after, when it occurred to me to examine the cyst, I found a very curious condition of things;—something I imagine perfectly unique. Untying the ligature placed

about the pedicle, I found within the main cyst two smaller ones, *with orifices opening into them from the outside*. (Fig. 1, *B B*, and Fig. 2, *C*). I confess my inability to explain the phenomenon. What force could have acted to have produced secondary cysts with mouths opening into the hernial sac, while the bodies of the cysts hung into the cavity of the main cyst, is inexplicable to me. Cysts within

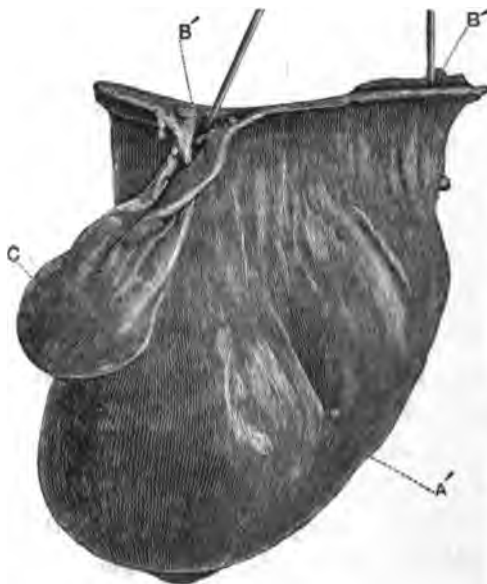


FIG. 2. CYST OF HERNIAL SAC.

A', main cyst inverted ; *B' B'*, mouths of smaller cysts inverted ; *C*, larger of the smaller cysts inverted—the other smaller cyst is hidden from view, and is much smaller than this.

hernial sacs are rare, but have been occasionally found. From the silence of surgical works upon the subject, they must be extremely rare.

Prof. Gross says : " In operating upon old strangulated ruptures the surgeon occasionally encounters an adventitious cyst, or a cyst formed by the obliteration of a part of

the proper sac. Its contents are either serous or bloody, and its size rarely exceeds that of a small walnut."

The presence of the cyst in this case explained the difficulty in the reduction. Compression in the taxis was expended upon the cyst and made little or no impression upon the true hernial contents.

The contents of the cyst—a clear, transparent, serous fluid—were never placed under the microscope.

The pedicle of the cyst, when *in situ*, seemed about as large as a good big goose quill, but when suspended by threads, and filled with water to be photographed, it presents a wide open mouth, as seen in the cut. The portion of the cyst just below the cut border presents a constricted appearance.

HISTORICAL AND BIBLIOGRAPHICAL NOTES.

A SERIES OF SKETCHES OF THE LIVES, TIMES AND WORKS OF THE OLD
MASTERS OF ANATOMY AND SURGERY.

By GEORGE JACKSON FISHER, M. D.

XXII. ABOU MERWAN BEN ABDEL MELEK BEN ZOHR, COMMONLY CALLED AVENZOAR.

1070—1161.



NDALUSIA, if not the native country, was assuredly the home of Avenzoar. Seville, the magnificent capital of Andalusia, was an ancient city in mediæval times. Andalusia was an extensive region in the south of Spain, and embraced "the four kingdoms," which are now divided into

eight provinces. It was the *Bætica* of Roman days, the *Tarshish* of the Bible, and in very ancient times a famous trading emporium of the Phœnicians, who were the earliest known inhabitants of the country. The name is said to have been derived from the Vandals who overran this part of Spain after the downfall of the Roman Empire, the country being called Vandalusia, and thence through an easy transition to Andalusia; some, however, say that it is but a ringing

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sound 'upon the Arabic name *Andalosh*, "land of the West." Seville was in the possession of the Arabians from 761 to 1248. During this semi-millennium it was in its glory, having attained a high degree of splendor and a population of three hundred thousand souls. The Guadalquivir still flows on through the fertile and delightful plain where the renowned old city stood, and still stands, and now no less than a hundred thousand Spaniards make their entrance and their exit through the fourteen ancient gates of the original Moorish walls, which still encompass the grand historic city. The six and sixty venerable watch-towers are still standing like sentinels on the walls to guard the denizens from dangers within and without. The modern traveler can feast his eyes upon many surviving examples of elaborate Moorish architecture, among which the Giralda, and the Alcázar, are the most notable, so, too, he can behold an ancient Roman structure known as the *Torre de Oro*, or the Tower of Gold.

This famous city, at the time when the subject of this sketch was pursuing his studies, making his numerous experimental observations, which gave him the cognomen of experimentator, and while practicing his art, was the royal residence of the Mahometan Caliph, who was the patron of this celebrated Saracenic physician, surgeon, and pharmacist, for he combined the three professions, as he himself tells us, quite contrary to the existing custom of the period. Abymeron Avenzoar, is said by some authorities to have been born at Penefflor, in the vicinity of Seville, while others say it was at Seville, about the year 1070, of the Christian era, though upon this point much discrepancy exists amongst the biographers and historians, as also concerning the time of his death. After much perplexing research, I have fixed the above date at the head of this sketch; and that of 1161, for the year of

his demise, which allow him to have lived ninety-two years. Freind, however, and his copyists, say that he attained to the extraordinary age of one hundred and thirty-five years ! Our old friend, Atkinson (Med. Bib., p. 65), exclaims " How little interesting must time have been in former ages, when it was not worth recording, at least with precision."

As with the other examples of the names of Arabian physicians, so with this, do we find it written with many variations. I have found it in all of the following forms ; Avenzoar, Abenzoar, Abynzoar, Abynzohar, Aynzoar, Albuleizor, Aben Zohr, Ebn Zohr, Ibu Zohr, Abymeron Avenzohar, Abymeron abynzohar, Abhomeron Abynzohar, Abhumeron Abynzoar, Aben Zohr Alandalausi, Abu Meron Abenzoar, Abu Merwan Abdalmalec ibu Zohar, Abu Mervan Ben Zohr, Abou Merwan Ebn Zohar, Abou Merwan Ben Abdel Melek Ben Zohr.

It has also been corrupted into Alguazir Albuleizor ; Al Wazir Abu Merwan Abdelmelek Ibn Zohr ; Al Guazir Abualassar, and Zophar Ben Zohar.

The reader may select his choice among these twenty-two renderings according to his fancy for long or for short names.

It has been said that Avenzoar was the most illustrious physician and surgeon that ever flourished after the renowned Avicenna. His distinguished pupil, Averrhoes, looked upon him as almost a divinity in medicine, and poured upon him unmeasured praise, as will be found in various portions of his works, here calling him his admirable master, and there speaking of him as the glorious, the treasury of all medical knowledge, the supreme of physicians from the days of Galen, to his own time (*Averrhoes*, 30, 39, 52, 56, 64).

Avenzoar almost inherited his medical knowledge and skill. His father and grandfather were physicians of very

great celebrity in their day. In turn he transmitted the science and art of medicine to his son, of whom I shall have occasion to speak a little farther on. It is alleged that he began the study of medicine at a very early age, that his father Abd-el Melek began to teach him his profession at the extremely youthful age of ten years; some authors say at twenty, and in one I find it set down, that he commenced the study at the advanced age of forty years. When his medical instruction was completed at Seville, as is said with great credit, his father required him to take an oath, never to administer poisons. In that day poisoning was no uncommon practice among the Saracens.

He was profoundly imbued with all the learning of the period. He was an accomplished linguist, being a perfect master of the Hebrew, Syriac, and Arabic languages. His reputation extended over the whole land, and he was in constant correspondence with the most renowned physicians of his time, by whom he was regarded as only equalled by Hippocrates, the father of medicine. As late as the fourteenth century, he was honored as a sage. His talent was not entirely devoted to medicine, his poetical compositions were prized no less than his prose.

Avenzoar had the honor of being the physician to Ali ben Temin, king of Seville. He rendered a valuable service to his master by curing his brother, the Count of the royal stables, of a jaundice said to have resulted from intentional poisoning by his own family; and as a recompense for his skill, he was cast into prison, where he continued to languish until released by Joseph ben Tachefyn, prince of Morocco, who drove Ali the king of Seville, and all the other petty tyrants from Spain. (Dunbar's translation of *Carmoly's History of the Jewish Physicians*, p. 43-46.)

I will pause just here to refresh the mind of my

readers with a brief historic note concerning the origin and duration of Arabian dominion in Spain, and for this and much other information relative to Avenzoar and other Saracenic medical characters I am indebted to Freind's "History of Physick," as well as to Eloy, Moir, and many other medical historians, for, aside from the striking sameness of detail, and I might add of language of most of these authors, yet, by long and perplexing research one is repaid for his pains by little incidents and facts scattered in bibliographies, encyclopædias, and the like, by which he can weave a fabric, that may have the merit of freshness of figure if not of newness of material.

About the one hundred and thirty-ninth year of the Mo-hamedan period (A. D. 761), Abdal Rhaman, the son of Moavie, of the house of Omniah, after the entire destruction of that family by the Abbasidae, fled into Spain, this being in the time of Almanzor, who reigned at Bagdad. Abdalrhaman was accepted and acknowledged as the lawful Caliph of the Arabians in the West. His royal residence was at Corduba, or Cordova as now called, where he built the great Mosque, and founded the Saracenic monarchy of Spain.

Under this government the University was founded, the city of Cordova became the most famous of any in the West for literature and science, and possessed an extraordinary library of a quarter of a million of volumes, carefully preserved, arranged, and duly catalogued. This catalogue consisted of no less than forty-four volumes. As a result, this city produced one hundred and fifty authors of celebrity in the various departments of literature. Nor was all this enlightenment confined to the capital city, at least seventy public libraries existed in various parts of Spain, and flourishing academies were also established at Seville, at Toledo and at Mercia. Hospitals and public schools were also established in various parts of Spain.

The posterity of Abdalrhaman continued to reign in various parts of Spain even after Andalusia had been taken from them, down to the eleventh century, when the prince or king of Morocco dispossessed them, and established Moorish dominion in the place of Arabic rule. It was at this juncture, as above stated, that Joseph ben Tachefyn, the Moore, gave Avenzoar his liberty, took him into his service, and with great generosity loaded him with riches and honors. He was appointed a professor in medicine, and long taught the science with success, and contributed largely to the dissemination of a purer and more rational system of medicine than had hitherto been known to the occidental Arabians. Among his distinguished pupils was Ebn Roschid, better known as Averrhoes, and his own son Alhafid, or the descendant, who succeeded to his honors and rose to eminence in his profession.

Avenzoar was not only ennobled by ancient and splendid descent, but possessed of an ample hereditary fortune which rendered it unnecessary for him to practice his profession for the purpose of pecuniary gain, his chief motives being a genuine love for the science and art of healing, and a desire to benefit the community in which he lived. So, we are told, he bestowed his services gratuitously on persons of small fortune, and ungrudgingly to the poor, not, however, refusing presents from the rich, and thus he was as charitable as he was skillful, as liberal as he was enlightened, at once a benefactor and an ornament to the city of his adoption. The principal work on medicine which was written by Avenzoar, and which time has permitted to survive and come down to our own hands, was entitled by him *Tèissir*, or the *Introduction*. I find great variation in the spelling of this word. Freind has it *Thaisser*; Carmoly uses *Tèissir*; Atkinson, *Theiseir*; Eloy, *Theisir*; the edition of 1490, *Liber theicrisi*; edition of 1497, *Theizir* and *Theyscir*; Jourdan, *Thei-*

sir ; Sprengel, *Taisyr* ; elsewhere, *Taisir*, *Teisir*, *Tayasser*, *Tajessir* and *Theysir*.

This work treats of remedies and regimen for most of the diseases which were known. It also contains several items of personal history. It is here that we learn that Avenzoar had charge of a hospital, and that he was frequently employed by command of the Caliph.

His *Antidotarium* or method of preparing medicines and diet has also been preserved to the present time. Both of these works were translated from the Arabic into the Hebrew in the year 1280, and from thence into the Latin language by Paravicius, whose version was first printed at Venice in 1490, by "J. de Forlivio et Gregor, fratres," also, in the same city, in 1496, and in 1497, each edition by different printers.

It is said that he wrote two treatises on fevers, and also a supplement to his *Taisir* under the title of *Jame*, or a "Collection." The *Taisir*, was dedicated to his royal master, King Joseph ben Tachefyn ; this is found in manuscript in the Royal Library in Paris, and in the Bodleian Library. Another of his works is dedicated to Ibrahim, son of King Joseph. From these dedications it would appear that these books were written after his release from prison by Joseph of Morocco.

I have already stated that his distinguished pupil Averrhoes held his master in the highest esteem. He expresses his appreciation of his works in the following complimentary terms. "In order to arrive at a profound knowledge of medicine, it is necessary to read carefully the works of Ebn Zohar, which are the real treasure of the art. He knew all that is permitted to man to know on these subjects, and we are indebted to his family for the true science of medicine."

It is more than probable that Avenzoar, as well as all of the other Arabic medical writers of Spain, were unac-

quainted with the medical works of the Asiatic Arabic authors. The fact that the writers of the East and West are equally silent and never quote from each other must find its explanation in the implacable hatred which existed between the two factions, which began with the feud that led to their final separation and the Arabic occupation of Spain.

Our author was a decided Galenist, his admiration for this ancient writer was unbounded and led him to ever follow closely in his wake. In sect he belonged rather to the Rational than to the Dogmatic School. He was opposed to quackery, to the pretensions and superstitions of the Astrologers, and gave no ear to the twaddle of the old wives of either sex. Yet there was a trace of superstition in Avenzoar, he believed somewhat in the virtues of amulets. He tells us that he suffered personally with Sciatica and Dysentery, and that he cured the latter by wearing an emerald over his abdomen, and speaks of the use of this gem administered in the form of powder, in doses of six grains, as a valuable medicine in this class of disease. That he felt the responsibility of his profession we find abundant proof in his writings. He lays stress on the maxim "that experience chiefly is the right guide and standard of a warrantable practice, and must absolve or condemn me, and every physician, both in this life and in the next."

He did not believe that the art of healing could be attained by fine, logical distinctions and sophistical subtleties, but only by good judgment and long use of means. For example, he says, "If any one would take it into his head to refine, and nicely distinguish about laxative medicines, and pretend to find out the proportional quantity and quality of any purge, so as to square it exactly to the constitution of the patient, and the nature of the humors to be discharged, and calculate it so as not to

be even a hair under or over ; such speculations in my opinion, contribute very little to form a judgment about any right method of cure."

Freind thinks he refers to *Alkindus*, who wrote a fanciful treatise on the qualities and doses of medicines.

Avenzoar applied himself to the study of medicine, pharmacy, and surgery. He offers an apology for having studied the two latter branches, contrary to the custom of the country, and the example of his own father. Thus it is evident that these were three distinct professions in his day. Surgery and pharmacy were regarded as inferior to medicine. Manual operations, and the preparation of medicines were done by the servants (*Servitores et Ministri*) of the physicians who were the *Medici Honarati and Nobiles*.

Avenzoar thus speaks of his application to pharmacy. "I have taken great delight in studying how to make syrups and electuaries, and I had a strong desire to know the operation of medicines by experience ; the way of extracting the virtues of them and the manner of compounding one with another."

Among the special articles, of which he gives some account, is the famous Bezoar. This is the first mention of this substance by any ancient writer. The Bezoar was held in very high esteem as an antidote of poisons, and as a valuable remedy in numerous diseases, for many centuries after the days of Avenzoar. Pomet, in his History of Drugs, gives an extended account of the source, character, and virtues of the several kinds of Bezoar, animal and mineral. Since this account of Bezoar, by Avenzoar, is the first of which we have any knowledge, it may be interesting to the reader to have it transcribed in his own words. "That is the best, which is found in the East, near the eyes of stags. Great stags, in those countries, eat serpents to

make them strong. And before they have received any hurt from them, run to the streams of water, and go into it so far, 'till it comes up to their heads; this custom they have from natural instinct; and there they continue without tasting the water (for if they should drink it, they would die immediately), 'till their eyes begin to trickle: this liquor, which there oozes out under the eye-lids, thickens and coagulates; and continues running, 'till it increases to the bigness of a chestnut, or a nut. When these stags find the force of the poison spent, they come out of the water, and return to their usual haunts; and this substance, by degrees, growing as hard as a stone, at last, by their frequent rubbing it, falls off. This is the most useful Bezoar of all." Persia and China were the chief places from which it was procured. Serapion tells us that it is so precious and valuable, that a palace of Cordova had been given for one of these stones (*Freind, History of Physic*, v. ii., p. 106).

Avenzoar treats of fractures and dislocations, and in a way that indicates a considerable amount of anatomical knowledge. He tells us: "I took great pains, when I was young, to understand the situation of the bones, and their connection one with another; and not only to be acquainted with but to perform operations with my own hands, and this with a very great eagerness and appetite for the thing itself, as husbandmen and huntsmen are delighted with the exercise as such. I was rather fond of this knowledge, because sometime or other it might be of use to myself or my friends, or to the poor." Freind is disposed to believe that Avenzoar was, to some extent, a practical anatomist, and had, in spite of the Koran, engaged in dissection.

He believed in the lancet in the cure of disease, and informs us that he bled his own son, who was but three years of age, with complete success. His works contain several

valuable observations and interesting cases, to a few of which I will briefly allude. He describes a case of abscess of the kidney, or entire disintegration of that organ, nothing but the capsule remaining, this being so enlarged and distended that it contained no less than fourteen pints of purulent fluid. Did he not make an autopsy in this case, how otherwise could he know the facts?

He gives a detailed account of a rare case of inflammation and abscess of the mediastinum, the membrane, he says, which divides the thorax in the middle. This case occurred in his own person. While on a journey, he says, he felt pain in that place, which increased and was attended with a cough. He found his pulse very hard and his fever very acute. The fourth night he drew a pint of blood. His symptoms were but slightly relieved; however, as he was obliged to travel all day, being much fatigued, he fell asleep at night, and during his sleep, the bandage of the arm came off. Upon awakening he found the bed swimming with blood, and his strength much exhausted. The next day he began to expectorate a sanious matter, and though afterwards he became delirious, he recovered, attributing his restoration to the great evacuation of blood, rather than to the large libations of barley water, which he had previously ordered to be given to himself. He declares it not to have been a pleurisy; that the most characteristic symptom was *a tensive pain lengthways*. This is believed to be the first recorded instance of this disease to be found in the ancient literature of medicine. In an after age both Columbus and Barbette treated mediastinal abscess successfully by trepanning the sternum.

[To be Continued.]

EDITORIAL DEPARTMENT.

SAYRE ON ORTHOPEDIC SURGERY AND DISEASES OF THE JOINTS.¹

Seven years have elapsed since the first edition of Prof. Sayre's work was published ; and it now appears "carefully revised and greatly enlarged." In the preface to this edition the author claims that "its present arrangement will make it more useful as a text-book for the student." How can the author hope to have his work considered in the light of a text-book with never an allusion to the great advances in joint surgery that have been made under Listerian methods? We grant that all men have the right to reject any or all theories in practice ; but a principle so thoroughly established as antiseptic surgery receives only a few lines notice in connection with the treatment of Hallux Valgus.

Imperforate anus is described on p. 52 in four lines, followed by one of the author's successful cases ; such a meagre account had far better be omitted from another edition.

Personally we feel that all honor is due Prof. Sayre for his pioneer work in Orthopedic Surgery ; and largely by his writings and teachings has the busy practitioner been taught the necessity for specialists ; the author pays such close attention to details, and has such a semblance of thoroughly instructing his reader, that it is only a personal experience in some of his methods that discloses their true value and leads one to say, "I have followed directions implicitly, yet here is a case in which I can accomplish nothing. Dr. Sayre is always successful, to him, therefore, shall the case be sent." It is of this that we complain ; for instance : What does the author do with the inveterate cases of talipes where exsection of the tarsus is deemed by many a necessity? No reference is made in the volume to even the existence of such an operation.

¹ Lectures on Orthopedic Surgery and Diseases of the Joints. Delivered at the Bellevue Hospital Medical College during the winter session of 1874-5. By Lewis A. Sayre, M. D., Professor of Orthopedic Surgery and Clinical Surgery in Bellevue Hospital Medical College, etc. Second edition, revised and greatly enlarged, with 324 illustrations. New York : D. Appleton & Co., 1883.

On the other hand, such a valuable contribution to the needs of the profession as the plaster of Paris jacket will always be a debt of gratitude due to Prof. Sayre.

We cannot but feel that more stress than is necessary is laid on the subjects of circumcision and clitoridectomy for reflex paralysis; the operation hardly seems called for in any of the author's cases. We are pleased to notice the attention given to shampooing of muscles, and trust that all that is claimed for electricity and injections of strychnia will stand the crucial test of experience. The immediate treatment—*i. e.*, from birth—of talipes is insisted on, and we are pleased to see the author's ideas regarding instantaneous stretching of talipes, which is a growing practice. One sentence on p. 111 should be read by every orthopedic surgeon, as it formulates the author's extensive experience in the adjustment of apparatus; it is, "the aim of every dressing or instrument is simply to imitate the action of the surgeon's hand, and that is best which nearest accomplishes this." Notwithstanding the strong commendation of the shackles applied to the feet in Fig. 91, which are intended to prevent inversion of the feet, we must doubt the ability of the patient who wears them, to locomote, except with great difficulty. Many surgeons would beg to differ with Prof. Sayre regarding the practicability of sub-periosteal excisions of the tarsus.

When the author considers the symptoms of morbus coxæ, we are filled with admiration, for he certainly presents a beautifully clear picture to the mind.

Dr. Sayre has done much to show surgeons what can be accomplished by exsections of the hip-joint and deserves the warmest praise; but on pages 286-7, is described an operation for the withdrawal of fluid from a tensely filled hip-joint:—the author first advises the use of the aspirator, but one not being "at hand" says, "a small trocar and canula *may* be employed"—the point of puncture advised "is immediately behind the middle line of the femur and *above* the large trochanter close to the superior margin of the gluteus maximus muscle." "The canula should not enter the joint perhaps more than one-eighth or one-sixteenth of an inch."

Is it possible to accurately estimate a sixteenth of an inch, in puncturing a hip-joint?

Every man can accomplish that with his own splint or ap-

paratus which others cannot ; so it probably is with Sayre's short splint which certainly has many theoretical objections.

A certain animus permeates the work which is objectionable ; on pages 254-5-6-7 a case is recorded as a very good illustration of the inefficiency of a certain plan of treatment, giving the name of the particular surgeon referred to. We looked in vain for cases recording the efficiency of that method of treatment—viz., by a high shoe and crutches, as it is unquestionably a plan, suitable at least for many cases. This sentence, regarding the same method of treatment, attracts our notice—"when first proposed I gave it a most cordial endorsement before I had any practical experience with it."

How much care does Prof. Sayre exercise in forming his opinions ?

We can hardly believe that Dr. S. D. Gross or, in fact, Dr. Sayre mean exactly what is said in the foot note on p. 464, which reads : " My friend Dr. S. D. Gross has recommended the application of the jury-mast, in addition to the plaster-jacket, in all cases of spondylitis where the disease is above the sacrum ; and my own practical experience has proved the wisdom of his suggestion."

Dr. Sayre's claim for his jacket is well set forth, and on p. 466 we have this sentence :—"Whereas in the plaster of Paris jacket the air can reach all surfaces of the body, it being perfectly porous." This we can consider but a flight of fancy. The treatment of lateral curvature is considered as best accomplished by plaster of Paris jackets, which he springs off and on, as a corset ; we think many surgeons would consider plaster of Paris the poorest of the various materials which may be utilized for this purpose ; leather, felt and silicate of potash, seem to meet the requirements. It is always a matter of interest to study the methods of success of eminent men ; and on closing these lectures, one can but feel that the author possesses a certain dramatic force in the presentation of his cases : for instance, when a patient is brought to him after having been treated by many distinguished surgeons, names given, upon seeing the case, he, Dr. Sayre, at once "grasps" the difficulty and speedily places his patient on the road to recovery. Dr. Sayre is a thoroughly successful man ; none but successful cases are recorded in the volume before us, we would that there were—an occasional failure would be

heaven to the mass, and would have assisted us in forming a just estimate of the author's observations.

Personal experience or exploits are always interesting ; and the author's wide reputation, marked ability and forcibly expressed ideas, lend a special charm to his work.

HERBERT L. BURRELL.

HOPKINS ON THE ROLLER BANDAGE.¹

This unpretentious little book pleases us. It is an attempt to take up a little corner of minor surgery and illustrate it in a new way, and to such an extent as to make a student independent of a living teacher. The author has appreciated the truth that in conveying information upon surgical affairs that involve manual operations, detailed working plans are of greater use than much descriptive text. Given the illustration of what to do, and the mechanical instinct of the surgeon should be sufficient to guide him as to how to do it. In preparing the illustrations which form the great merit of the book, the bandage was first applied to a living model; then a photograph was taken, and from these photographs drawings were made. Sixty-eight such illustrations give a very full series of representations of the various applications of the roller bandage to all regions of the body. We have but one criticism that we want to make, and that is upon the instructions which the author gives as to how the strip of muslin that has been torn for the bandage should be rolled up to form the roller. He says that after having started it by rolling the end by the fingers as you would a cigarette, or by winding it around a small rod, it is then held between the thumb and index finger of the left hand, and is made to revolve on its long axis by the thumb and fingers of the right hand, and thus the strip is to be wound up to its end. This makes a good picture. and if we had plenty of time and patience, would certainly produce the required roller, but most surgeons, after they had once experienced the advantages of their bent knee, as a surface on which to roll, and the palm of their hand as a rolling medium, would reject as unnecessary refinements the methods depicted here. L. S. PILCHER.

¹The Roller Bandage. By William Barton Hopkins, M. D., with seventy-three illustrations. Philadelphia: J. B. Lippincott & Co., 1883.

A CASE OF HIP-JOINT DISEASE, COMPLICATED
BY A FRACTURE OF THE FEMUR; ADAM'S
SUBCUTANEOUS SECTION OF THE NECK
OF THE FEMUR; DEATH.

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HOSPITAL, NEW YORK.

THE following case presents some very interesting and peculiar features, both in a mechanical and surgical aspect. From the very lengthy history of the patient, as it appears upon the records of the New York Orthopedic Dispensary and Hospital and of St. Luke's Hospital, New York, I gather the following facts, which comprise the most essential points:

Sarah S., aged five years, a resident of New York City, was received as an out-patient at the New York Orthopedic Dispensary and Hospital on June 20, 1870, coming under my personal care. Her father, an English seaman, and her mother, also English, were apparently healthy people. The former had suffered occasionally from rheumatism, but there was no trace, so far as could be ascertained, of any hereditary taint. The brother and sister of the patient were very strong and healthy, and the patient herself showed no especial evidence of struma, though she was paler and less robust than the other children.

When the patient applied for treatment, the mother stated that the cause was supposed to be "a violent fall upon the sidewalk." The examination of the patient developed the fact that she was suffering from hip disease, the left hip being affected. The history shows that she had been suffering for two years prior to her admission. The thigh was flexed and adducted, and the patient was walking upon crutches. There was very limited motion at the hip joint, movement being arrested at a certain point by a tetanic spasm of the muscles, whenever the limit of motion was reached. There was no abscess visible, and none could be detected by the most searching palpation.

The patient had been treated in a public institution of this city, where several blisters had been applied and a spica bandage had been worn. The effect of this treatment was a modification of the pain and an increase of the deformity.

A few days after the history had been recorded, I applied a long extension splint, at the residence of the patient, placing the limb upon an inclined plane, and using an abduction screw. On August 19, 1870, about two months after the patient applied for treatment, "the flexion and adduction were nearly overcome." On August 29, "the improvement is remarkable." On September 23, "excellent motion." On October 4, the patient was permitted to "run about out of doors," using the apparatus as a protection. This privilege was much abused by the patient and her mother. On November 17, I find the record, "does not receive proper care; large, hard tumor in groin; no fluctuation." December 9, "has symptoms of abscess." January 4, 1871, "has dermatitis from the adhesive plaster; name selected for the corps of lady visitors." February 15, "has better care since the ladies visited patient; is improving." March 6, "œdema still exists at hip." April 17, "œdema still at hip; no pain; good motion." May 2,

"motion better ; symptoms of abscess disappearing." July 10, "joint motion quite free."

This history illustrates a not unusual course of a patient in dispensary orthopedic practice. Feeling the great relief which the apparatus affords, and the deformity being overcome, these patients do too much. They become as active as other children who are not afflicted with joint disease. They are liable, sooner or later, from this cause, viz. : over-exertion, to have a relapse. They build up again by rest and care, as this patient did, to a point where with care and attention a very excellent result may, with reason, be expected. But this patient was so extremely active, that, notwithstanding the cautions and rebukes administered to the mother, the patient had her own way, with, in this case, a very unusual result.

July 23, 1871.—"Patient had a fall and fractured the femur, on the diseased side, at junction of lower and middle-third. The apparatus was uninjured." *Treatment*.—Removal of adhesive plaster on thigh to a point just below fracture. Traction with the hip splint, the fractured ends being held in apposition by a leather splint, which was snugly bandaged to the entire thigh. Patient was seen every day, and good traction was maintained. On August 25, it was found that the fracture had united perfectly in good position, and that there was one-half inch shortening, some, if not the greater portion, of which was due to the disease.

The patient was now put upon her feet, and she again commenced to walk about, using the apparatus, of course. On November 17, "the motion at joint good ; no symptoms of abscess present." Several unimportant entries show that the patient continued to improve up to December 19, 1873, when the apparatus was removed and the patient was kept under observation to test the effect which would follow the removal of the support. On January 19, 1874, it

was deemed advisable, on account of slight pain and reflex spasm to again apply the apparatus.

On April 14, 1874, the apparatus was again removed, and after watching the patient closely until September 10, 1874, she was discharged cured, with almost perfect motion at the joint, one and one-quarter inch shortening and a very slight limp. On November 18, 1875, the patient was visited. There had been no relapse; "general condition good; considerable motion at joint; one and one-quarter inch shortening."

This period of the patient's history is very instructive. After reaching a point where recovery was almost certain, she fell, and, by some strange combination of circumstances, broke the thigh bone that was protected by a strong extension splint. I anticipated much trouble in this case, and looked for a decided increase of symptoms. But by making a considerable amount of traction and using a coaptation splint, I succeeded in obtaining a good result as to the fracture, and protected the joint at the same time. There was no decided increase in the symptoms, and, as shown in the history, after a somewhat prolonged struggle, the patient was discharged cured, with good motion, and with an excellent and useful limb.

This experience with the hip splint in the treatment of a fractured thigh, and the favorable result obtained, under so many discouraging circumstances, led me soon after to adopt the same measures in a case of ununited fracture of the thigh, in an adult, aged 55, who had four months previously been thrown from his carriage. The surgeon who attended the case immediately after the fracture used the gypsum bandage.

When I saw him there was three and one-half inches shortening, and the point of fracture at junction of upper and middle thirds was easily demonstrated. I applied a

long extension splint, and drew the limb down to nearly its normal length, and maintained it there for four weeks. Then a modified support was applied, and in four months union was complete, with about one inch shortening. Another case very similar to it in all essential particulars came under my care two years ago, and was treated in the same way. The result was perfect union in three months. A case of recent fracture of the thigh was also treated by Dr. George A. Peters, in St. Luke's, Hospital by this method, in a child, with an excellent result.

As to the course pursued by the patient after the last record made above, we have no positive evidence. It is to be presumed that the child followed her own inclinations, as the mother had no control over her, and the father was either absent from home or sick. The patient told me, after she entered St. Luke's Hospital, that she had had several severe falls, and that she had been pushed down by her playmates at school, and that after each fall her hip would hurt her more. She said that she was afraid that the splint would be applied again and that she did not come to the Dispensary on that account. Be that as it may, on September 23, 1878, just four years after the patient was discharged as cured, she presented herself at the Dispensary again, when she was examined by Dr. George A. Peters and myself. The thigh was found to be flexed at 75° and adducted at 30° . The measurements were as follows :

Length left leg.....	28 $\frac{1}{2}$ inches.
Length right leg.....	29 "
Circumference of the left thigh at a point six inches below ant. sup. spine of ilium.....	13 $\frac{1}{2}$ "
Circumference of the right thigh at a point six inches below the ant. sup. spine of ilium.....	15 $\frac{1}{2}$ "

There was no perceptible motion at the hip joint, no pain, and there was no evidence of inflammatory action. There was, apparently, an ankylosis of the hip joint in a very bad

position, rendering locomotion without crutches impossible. Under these circumstances it was advised that the patient enter St. Luke's Hospital for the purpose of having Adam's operation performed, in which advice Dr. Peters concurred.

The patient accordingly entered St. Luke's Hospital on January 8, 1879, in the service of the orthopedic surgeon.

The same measurements as those previously recorded are found in the St. Luke's record, and a few days previous to the operation I examined the joint under ether, to assure myself that the condition was not one of pseudo-ankylosis. No movement was perceptible under a not very profound anæsthesia.

On January 28, 1879, with full Listerian precautions, and assisted by Dr. G. H. Wynkoop, I made an incision and passed the saw down to the neck of the femur. After sawing for about thirty minutes, I estimated that the bone was nearly severed, and that it would be safe to make an attempt to fracture the remaining bridge of bone. I withdrew the saw and made forcible flexion. The limb yielded. After some manipulation, and without the aid of tenotomy, the limb was brought into a good position. The wound was washed out thoroughly with a solution of carbolic acid (1-40) and considerable "sawdust" removed. A complete Lister dressing was applied, without a drainage tube, and the limb was placed in a long extension hip splint, with the lateral screw.

For the following memoranda I am indebted to my assistant at St. Luke's Hospital, Dr. John F. Ridlon.

January 28, 8 P. M.—Complains of pain in hip. R. Magend. Sol. *q v.*

January 29, 7 P. M.—Redressed under spray. There has been a small amount of bloody discharge. Temperature, 100.8°.

February 2.—Temperature has raised from 100° to 101.2°.

Redressed at noon under the spray. There has been some serous discharge. No pus.

February 4.—Re-opened under spray. Same conditions as before. Little serous discharge. Temperature (P. M.), 101.2° .

February 8.—Dressing removed under spray. Lister discontinued. Simple dressing substituted, there being only a little serous discharge. Opening closing. Irrigate with 1-40 carbolic wash. Patient placed in prone position and extension of thigh made to overcome a slight flexion of thigh. Temperature, 100.2° .

February 12.—Some puffing at point of incision, which closed two or three days ago; opened and a little brownish serum discharged. Temperature, 101.6° .

February 15.—Still little serous discharge; no pus has, as yet, been discharged. Temperature, 101° (P. M.) There was discovered a slight *abduction* of the limb. Straps were passed over the shoulders, from the hip band of apparatus, and by the aid of the lateral screw adduction was successfully performed; opening closed.

February 17.—Limb in good position.

February 19.—Some puffiness again at seat of incision. Opened as before, with some serous discharge, about $\frac{3}{4}$ ss in quantity.

March 1.—Temperature ranges between 99° and 100° . No pus has been discharged from the opening. Patient is improving in appearance.

March 9.—Temperature normal for several days. Opening has been closed several days. No puffiness or pain.

March 22.—Temperature has not been taken since last entry, patient having done so well. Puffiness and fluctuation again at point of incision, which has remained closed since last entry, the patient having been kept in the recumbent position ever since the operation. Incision made and exit given to about $\frac{3}{4}$ j of *sero-pus*.

March 22, 3 P. M.—Temperature, 103.5° ; 7 P. M., 102° .

March 23.—Afternoon temperature, 101° . The cavity is hyper-distended with 1-40 solution of acid carbollic, and subsequently injected with Bals. Peru. and covered with oakum; about $\frac{3}{4}$ ss of thin pus is discharged daily.

March 30.—Afternoon temperature, 101° . Has been normal for several days. No pain. The probe does not touch dead bone.

March 31.—Felt chilly last night, vomited early this morning. Had quite a decided chill to-day. Temperature 103° . No cause of trouble apparent, except the pus. Complaints of pain at times in thigh and at knee. Cavity and discharge about the same.

April 2.—Temperature down to 99° and 100° again. No bad symptoms.

April 11.—Temperature went up again to 103.5° and went still higher in evening.

April 14.—Temperature again at 99° . There is some tenderness and induration on anterior part of thigh just below Poupart's ligament.

April 20.—Evening temperature, 103° . Good general condition except during time of high temperature.

April 21.—Temperature about normal again. Cavity remains about the same as three weeks ago.

May 13.—For several days a small abscess has been forming a little below the ant. sup. spine of ilium. To-day it opened spontaneously. $\frac{3}{4}$ i of pus discharged with considerable bloody serum. Injection of the sinus at point of operation, finds its way out through this abscess. The probe passes into old sinus about four inches directly inwards, following the line of original incision, but does not reach bare or necrosed bone. It also passes in another direction inwards and forwards about the same distance. The probe entered the last abscess only a short

distance. No dead bone discovered in any of these sinuses.

May 26.—Allowed to get up and move about on crutches. General condition good.

August 15.—General condition has been good. Splint temporarily removed a few days ago on account of excoriations. Splint reapplied to-day. Afternoon temperature 103.20.

December 12.—Previous attack subsided in a few days. To-day the patient had a severe headache and fever. (No record of temperature appears.) Complains of pain in thigh.

December 15.—A small abscess opened on thigh, and an ounce of healthy pus evacuated.

January 5, 1880.—Discharge has improved and has almost ceased.

March 8.—Very slight discharge. General condition good.

June 10.—General condition excellent. Patient healthy and strong. Walks without an extension splint, sinuses still open.

July 19.—Probe passed in four inches, but no dead bone discovered.

September 15.—Examined by Dr. Geo. A. Peters at my request. No denuded or dead bone could be touched in any of the sinuses.

November 16, 1880.—Discharged improved.

Prior to the discharge of the patient I had on several occasions begged the mother to permit me to enlarge the original incision, and to make a thorough investigation into the condition of the parts. She always refused, and when the patient was discharged, it was with the understanding that if she became worse she was to return for a further operation.

After her discharge from the hospital the patient changed her residence, and though I made repeated efforts to find her, I could not succeed in discovering her. On February 9, 1881, the mother came to the Dispensary again and requested professional attendance. The patient, under the poor care and unrestricted exercise, had become gradually worse. The limb had again become deformed, being flexed and adducted. Sinus after sinus appeared upon the hip, until it looked, at a short distance, as though it had been riddled by buck shot. The probe now reached dead bone, and it appeared as if the shaft was wholly exempt from the necrotic process. At the site of the head of the bone there was very evident necrosis.

Again the mother declined to permit any operative interference, and I reluctantly turned the patient over to Dr. Simeon A. Foster, the out-door visiting surgeon of the Orthopedic Dispensary, who, at my request, kept a record of his visits and watched the patient until her death, which occurred from exhaustion on April 1, 1881, two years and three months after the operation. The mother declined to permit any explorations after death.

The behavior of this patient after the operation is very suggestive. Without going into a detailed analysis of the symptoms presented, it would perhaps be well to give the impressions I received at the time of the operation, and to ascertain, in the absence of post-mortem certainties, if the subsequent erratic course of the case does not confirm these impressions.

As a matter of precaution, it will be remembered, I gave the patient ether a day or two prior to the operation, to determine whether or not actual ankylosis existed. The test at the time satisfied me that true ankylosis did exist, though I did not carry the anæsthesia to a very great degree. When, however, at the time of the operation, the

anæsthesia became profound, and the muscles acting upon the hip became thoroughly relaxed, and I had made a nearly complete section of the neck of the femur, I applied a considerable force, with a view of fracturing the remaining bridge of bone. I believe this bridge did not fracture. The motion occurred, I am quite sure, at the joint itself—an incomplete ankylosis being weaker than the unsevered neck. I was struck, in sawing through the neck, with its extreme density. It certainly was healthy bone tissue. Had a false point of motion been established at the place of partial section, there would have been a *sudden* fracture. But, and this excited my suspicions at the time, the yielding was gradual, and I could feel a succession of short “snaps,” such as I have felt when breaking up a partially ankylosed knee joint.

The condition of affairs, then I thought, amounted to this. I had made a partial and nearly complete section of the neck of the femur, and had re-established motion at the formerly diseased articular surfaces. Just how soon the partially severed section would become necrotic under those circumstances I thought, depended upon the depth of the section. In other words, the fate of this section of bone depended upon its blood supply, with a certainty that a violent acute inflammation would occur at the disturbed joint surfaces.

The sequel, I think bears me out in my suspicions, and carries with it a lesson that, I feel, ought to be recorded. Had I been permitted to enlarge the original incision and remove the necrotic bone I think that the result would have been different.

CARBONIC ACID GAS AS A LOCAL APPLICATION TO CHRONICALLY INFLAMED MUCOUS SURFACES.

By A. ROSE, M. D.,

OF NEW YORK CITY.

VON ZIEMSEN,¹ for certain cases recommends inflation of the large intestine by carbonic acid. His method is to develop the gas within the intestine, by introducing through a rectal tube first bicarbonate of soda, then water, and finally tartaric acid. Having the large intestine inflated, he found he was enabled to diagnosticate situs inversus viscerum, to demonstrate an acquired pathological position of the colon. He recommends this method for the purpose of ascertaining the relative position of the large intestine to a floating kidney, and to ovarian, and other abdominal tumors. By means of such inflation he discovered communication between the colon and stomach and between the small intestine and stomach. It also enabled him to study the relations of a fistula of the cœcum extending through the abdominal wall, and of a carcinomatous vesico-rectal fistula. Inflation was most of all serviceable in cases of stricture of the large intestine. In several such cases the exact location of the stricture could be ascertained, the surgeon being guided to the very point where to enter upon the gut.

v. Ziemssen uses a solution of 10-12 grammes of bicarbonate of soda, and somewhat less tartaric acid to evac-

¹ *Die künstliche Gas Aufblähung des Dickdarms zu diagnostischen und therapeutischen Zwecken. Deutsches Archiv für klin. Med. Bd. xxx, p. 235.*

uate the large intestine of its contents. He found the method of inflation preferable to that of pouring in water for the purpose of rendering passable stenoses and strictures of the colon.

He most emphatically advocates sudden expansion by means of carbonic acid to reduce abnormal positions, strangulations, intus-susceptions and twistings of the colon, as they are caused by perityphlitis, pericolicitis, or proctitis. Thus v. Ziemssen applied carbonic acid as a mechanical agent.

The physiological effects of carbonic acid upon the epidermis have been studied by Beddoës, Abernethy, Herpin, Heidler, Pacot, Demarquay, Landriany, Collard de Martigny, Chaptal, Mitchell, Ozanam, Fleury and others: If carbonic acid is allowed to act upon the epidermis for a certain length of time, there is experienced a sensation of warmth, extending from the point of application upward, followed by prickling and formication, and accompanied by increased perspiration and reddening. Anæsthesia sets in only after long continued action, and on very circumscribed points; there is also noticed after long continued application of carbonic acid to the skin, a considerable swelling of the latter. The effect of carbonic acid when thus applied, is by no means limited to the skin itself, the gas becomes absorbed and causes, by entering into the blood, certain effects upon the organs of circulation and innervation. Headache and a certain form of intoxication, mark the moment at which the carbonic acid enters the blood. The local effects appear earlier and more intensely, and absorption takes place more rapidly, if the skin is deprived of its epidermis. On ulcerated surfaces, carbonic acid, besides being an excellent local anæsthetic, acts as a disinfectant and an antiseptic. It controls the decomposition of the secretion of ulcers.

Demarquay made use of carbonic acid gas in the treatment of chronic ulcers of the leg by encasing the latter in rubber bags, which he charged with the gas. Johnson asserts that he saw excellent results from the application of carbonic acid to diphtheritic ulcers. Broca, and after him Demartis and Demarquay applied carbonic acid in neuralgia of the bladder.

In general carbonic acid has been successfully employed in such forms of neuralgia as are amenable to local treatment, as, for instance, neuralgias of the uterus. It is highly recommended in the treatment of amenorrhœa and dysmenorrhœa. Ulcers of the cervix uteri, upon application of the carbonic acid gas douche, cease to be painful and heal promptly. Scanzoni and Simpson have introduced local applications of carbonic acid into gynæcological practice.

The beneficial effects of carbonic acid on ulcerating surfaces in general, and on ulcers of the neck of the womb in particular, suggested to my mind the idea of applying carbonic acid to the ulcerated mucous membrane of the rectum; the case which I selected was one of obstinate dysentery, and the result was a very happy one:

Mary R., nineteen and a half years of age, born in Ireland, four months in America. Domestic. Fairly developed had been enjoying tolerably good health, "but was never very strong." She began to menstruate at seventeen years of age. Her menses appeared every two, sometimes every three weeks, lasting from four to six days, and were painful at the beginning. On September 2, 1883, she was taken sick with fever, diarrhœa characterized by tenesmus, and vomiting. The day following the stools contained matter and blood. I saw her first on September 5th, and poured in both large and small quantities of warm water at varying intervals, while the patient occupied a

recumbent position. I did this as I had often found it successful in relieving tenesmus. None of the drugs employed, such as Calomel cum opio, Oleum ricini cum opio, Tannin, Bismuth and Plumbum aceticum had any marked or lasting effect. The patient remained feverish and suffered greatly almost every night from frequent tenesmus, discharging blood and matter, sometimes with fæcal matter resembling masses of blue clay. The little relief she obtained, was more from application of ice or iced cloths to the abdomen, than from any of the other means employed.

On September 19th, Dr. Alfred Bessard, of this city, anæsthetized the patient, and I proceeded to make a thorough examination of the rectum in the way described by Dr. T. Gaillard Thomas.¹ The mucous membrane as far up as it presented itself to view was swollen, of a dark red color and studded with deep ulcers, thickly covered with matter. After having cleansed the rectum with water from a Davidson's syringe, I wrapped a piece of wet cotton around the end of a rod, and, having dipped the cotton into pure nitric acid, lightly touched the swollen mucous membranes, and all the ulcers in the manner practiced by Dr. Thomas. The first night after this procedure, the patient slept well, did not suffer from tenesmus, and felt better every way, but the night following she was, as she and her friends expressed themselves "as bad as ever." I then ordered suppositories of iodoform; they brought only temporary relief, and the same was the case with injections of chloral.

Almost from the commencement of her sickness, the patient had been coughing; physical examination showed slight dullness on percussion on the right side, below the

¹ Remarks on chronic dysentery with the history of a case, etc., New York Medical Journal, January, 1876.

axilla, between third and fifth ribs, and corresponding with this area, crackling sounds on inspiration. The patient being very much reduced by constant fever, restlessness and pain, and presenting this probably metastatic or perhaps hypostatic affection of the lung, her case appeared indeed a desperate one.

In the forenoon of September 27, I inflated the rectum with carbonic acid gas, and this one application, which caused no discomfort or tenesmus, was at once followed by a change for the better. There was no fever on that evening, and very little tenesmus during the night; she slept well and improved, so to say, from hour to hour in



FIG. 1. ROHLAND'S CARBONIC ACID DOUCHE ; FORM FOR EXTERNAL APPLICATION.

every way. There was some matter and blood discharged, only during the night following the first application, the next morning she had a natural evacuation from the bowels without either matter or blood *and never again discharged either*. Tenesmus ceased gradually during the following nights. There was no more straining after October 1. For nearly five days the bowels moved as often as five or six times daily, very little at a time, passages in the shape of small hard balls; and as long as this was the case, I had the carbonic acid douche applied three times a day. The patient describes the effect of such applications as

being that of an agreeable sensation, and she asks for it. During the days immediately after the first inflation tenderness and irritability of the stomach existed, which disappeared promptly after the patient had taken a few powders composed of ten grains each of Subcarbonate of Bismuth and Bicarbonate of Soda. The condition of the stomach having been corrected, the appetite improved rapidly. After October 2, the patient was able to be out of bed all day. The bowels since October 4, moved regularly and naturally once a day. There is still slight dullness on percussion on the right side and diminished breathing, but no more crackling sounds, and the cough has almost ceased.

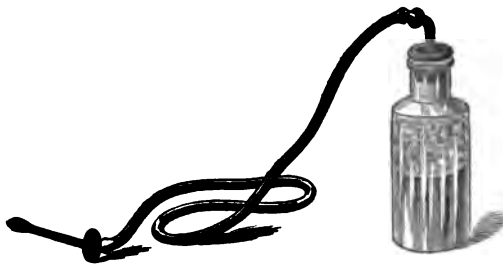


FIG. 2. ROHLAND'S CARBONIC ACID DOUCHE ; FORM FOR INTRODUCTION OF GAS INTO CAVITIES.

Carbonic acid, when introduced into the large intestine, as a rule, does not pass the ileo-cæcal valve, and in those cases, in which the resistance of this valve is overcome, it does not establish a complete communication between the large and the small intestine, or a perfect balance of tension in both, or only small amounts of the gas pass ; these, however, proceed and enter into the stomach. According to v. Ziemssen's observations, it seemed as if the power of resistance of the valvula Bauhini was somewhat lessened during deep chloroform narcosis, and the small intestine then became measurably inflated. Carbonic

acid is absorbed by the mucous membrane of the intestine, it passes the veins, enters into the portal vein and into the liver. Its effect on the mucous membrane of the intestine was to redden it, and cause an agreeable sensation of warmth.

The apparatus I employed for the purpose of inflation, is an invention of Dr. Robert Rohland of this city, constructed originally to apply the carbonic acid gas douche to the male sexual organs in the treatment of impotency as recommended by Wertheim,¹ and to the vagina in the treatment of certain uterine diseases.

Wertheim has omitted to describe his contrivance for the application of the carbonic acid gas douche. Dr. Rohland's apparatus (Figs. 1 and 2) consists of a bottle holding a pint or more, with wide neck and rubber stopper, perforated so as to admit a tube which later enters into a rubber tube at the end of which is attached a rubber bag for the encasement of the penis and scrotum. This apparatus commends itself in the treatment of some surgical diseases of the penis and scrotum, particularly of phagedenic ulcers. To apply the gas douche to these organs, a solution of six drachms of bi-carbonate of soda in about eight ounces of water is introduced into the bottle, and four drachms of crystallized tartaric acid (if pulverized acid is used, the development of the gas goes on too rapidly), are added. The bottle is then quickly closed, and the carbonic acid rises through the tube, inflating the bag, which has been placed in position before the tartaric acid is put into the bottle. To apply the douche to the vagina, the nozzle of a vaginal or rectal syringe takes the place of the rubber bag, and to prevent the escape of the gas before such is desirable, a rubber valve to close the orifice of the vagina is fastened some inches below the point of the nozzle.

¹ *Kohlensäure gegen Impotenz. Wiener med. Jahrb. 1882, p. 10.*

This attachment, originally intended for the vagina, serves, very admirably for the rectum, although the valve can be dispensed with, as the sphincter ani itself may in some cases prevent the return of the gas before the rectum, or the large intestine has been sufficiently inflated. Where the gas is not retained long enough, a rectal tube may be attached to the apparatus.

The beneficial effects of carbonic acid on catarrhal and on ulcerated mucous membranes, its disinfecting and controlling power over perverted secretions of such membranes, should suggest its application in cases of chronic rhinitis, pharyngitis, cystitis, urethritis and prostatitis, which so frequently prove obstinate to all remedies used. Sanders and Hulme report that they succeeded in dissolving phosphatic concretions formed in the bladder, by introducing carbonic acid gas into this organ.

A CASE OF LAPAROTOMY FOR RELIEF OF INTERNAL HÆMORRHAGE FROM RUPTURE OF FALLOPIAN TUBE, COMPLICATING TUBAL GESTATION—DEATH FROM SHOCK.¹

By CHARLES K. BRIDDON, M. D.,
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MRS. K. I. K., æt. twenty-eight, a short, stout brunette, measuring five feet and less than one inch, and weighing one hundred and fifty-five pounds, is the mother of two children, one three years, the other thirteen months old. She has always enjoyed good health. Her last normal menstruation occurred on the tenth day of August, 1883.

¹ Reported to the New York Surgical Society, November 13, 1883.

Two months subsequently, on the tenth day of October, she had a flow of clotted blood accompanied by pain of an intermittent character. On the sixteenth day of the same month, while out walking, she was taken with sudden severe pain, and was obliged to sit down for some minutes. The pain continued with diminished severity until and after she reached home. When I saw her she was suffering considerably. The pain was pelvic, and did not appear to be more acute on one side than on the other. It was continuous, but aggravated at uncertain intervals by paroxysms of increased severity. She says that when the pain attacked her in the street she felt something flow from her vagina, but on examining her linen found it only soiled with a little mucus. She complained of being unable to urinate. There was no increase of temperature; no acceleration of pulse or respiration. On making an examination I found the os low, and slightly displaced forward. It was soft, and dilated sufficiently to admit the first phalanx of the index finger. The body of the uterus was exquisitely sensitive and enlarged. Though the physical conditions of retro-version were not present, I thought the inability to urinate might be occasioned by some mechanical impediment. I emptied her bladder, and placing her in the knee-elbow position, found that on opening the vulva the uterus receded, and there was nothing at all to be felt in the cul-de-sac. Rest and a few doses of chlorodyne for treatment, and in a few days she was well.

In the afternoon of the 29th she was again attacked with pain, and although there was no flow, I suspected that abortion was imminent, and prescribed an anodyne and rest. I received a second urgent message to see her at 7 P. M., and I found her suffering from symptoms of internal hæmorrhage. She exclaimed that she was dying. Her extremities were cool, her face was pallid, and I could detect no radial

pulse. I had no hesitation in expressing the opinion that the case was one of tubal pregnancy, and that rupture had taken place. I explained the dangerous character of the condition to her husband, the probability that prompt action would have to be taken, and I requested counsel. Dr. H. F. Walker saw the case with me before nine o'clock, and suggested that we should call in Prof. T. G. Thomas, who saw the patient at half-past nine. There was no division of opinion, all were agreed that an abdominal section and the institution of such means as would secure against the further escape of blood, were the only ones calculated to afford even the slightest chance of recovery. The consent of the patient and her friends being obtained, the only delay was occasioned by the insistence upon their part that she should receive the sacrament before the operation.

I was ably assisted by my friends, Drs. Gerster, Walker and Scharlau, and it affords me great pleasure to testify to the kindness and promptness with which they responded to my call for assistance under very trying circumstances. Ether was administered by Dr. Scharlau, and very little indeed was used. The corpulence of the patient made it necessary to make a long incision, reaching from the umbilicus to the pubis. Her collapsed condition rendered this almost a bloodless proceeding. When the peritoneum was exposed a small incision was first made, which gave exit to a large amount of fluid blood. The incision was then enlarged sufficiently to admit the hand, and at least a pint of blood clot was scraped out as rapidly as possible. The uterus was then drawn up as far as its connections would permit, and the cause of trouble was at once apparent. Part of an ovum, one inch and a quarter in diameter, was found protruding from a rent in the left fallopian tube, close to its uterine extremity. The broad ligament was lifted as much as possible, and a probe armed with a double stout plaited

silk ligature was passed through it as low down as could be done, and the ends were firmly secured above the free border. In these manipulations the ovum was forced from its bed in the oviduct, and was removed entire. The hæmorrhage appeared to be entirely controlled. The ligatures were cut short, and the toilet was completed by thorough cleansing of the cavity. The wound was then closed by silver-wire sutures. No time was lost in completing the dressing, the patient was removed at once to bed, surrounded with blankets and hot bottles, her head was enveloped in a warm woollen shawl, a small hypodermic of morphine was administered, and the subcutaneous use of brandy resorted to. It was not, however, until after midnight that an occasional flicker could be felt in the pulse at the wrist. Vomiting, which occurred, was treated by frequent sips of hot water; nutrient and stimulant enemas were used all through the night. On the morning of the 30th her appearance was much improved. She was inclined to talk, was even cheerful, and expressed herself as entirely free from pain. She only complained of vomiting. But, notwithstanding these favorable signs, her pulse could scarcely be felt, much less counted; at times it could not be distinguished at all. Temperature was 101°, respiration 36. At 10 A. M. her pulse could be counted 126, and after this it improved for twenty-four hours, averaging 130. Temperature for the same period 101 to 102. In spite of the most assiduous stimulation, the circulation could not be maintained. She began to sink on the afternoon of the 31st, and died at 9.30, forty-seven hours after the operation.

Sectio Cadaveris. Oct. 31, 11 P. M.—Abdomen only moderately distended, abdominal wound agglutinated, but easily separated; omentum adherent to peritoneal surface in the neighborhood of the line of incision; no general diffuse peritonitis. About two ounces of odor-

less bloody fluid in the cavity of the pelvis; the left broad ligament adherent to anterior wall of rectum; uterus enlarged to nearly twice its normal dimensions. At the junction of the left oviduct with, and encroaching upon the cornu itself, was an ovoid swelling about one inch in diameter, darker than the surrounding structures, of a mottled violaceous maroon color. Near the junction of the posterior wall of the duct with this swelling was a ragged opening, half an inch in length, and leading into a cavity formed mainly out of that portion of the duct that traverses the uterine wall, so that the specimen might be said to represent the variety known as interstitial, or, more correctly, sub-interstitial. On incising that portion of the cavity that was developed at the expense of uterine textures, it was found filled with adherent coagulum. The cavity of the uterus was not lined with decidua, and the uterine opening of the oviduct was impervious. Outside the rent were found the ligatures applied during life, and which had effectually controlled the hæmorrhage.

REMARKS.

About twenty years ago a surgeon of this city—the late Dr. Stephen Rogers—was a vigorous advocate for the performance of laparotomy in cases of internal hæmorrhage due to rupture of the oviduct; but the profession at that time was not prepared to accept the proposition. The great advances that have been made in abdominal surgery since then has paved the way, and although I am not aware that the operation has been performed, I can state advisedly that the matter has been much debated, and that the views of Dr. Rogers are now generally approved. Graily Hewitt says, in the last edition of his work on the pathology, diagnosis, and treatment of the diseases of women:

“In cases of fallopian pregnancy, if it were possible to make an exact diagnosis of these cases of rupture and hæ-

morrhage during life, it would, undoubtedly, be better to open the abdomen and endeavor to secure the bleeding vessels than to allow the patient to die of hæmorrhage. No operation of the kind has ever been attempted, but the subject has formed matter of discussion on more than one occasion at the meetings of the Obstetrical Society of London."

Lawson Tait, in his recent book "On the Diseases of the Ovaries," says:

"I have very little doubt, however, that many of these cases would be saved by prompt action. The difficulty is, of course, in the diagnosis, some certainty of which is requisite before an abdominal section can be performed. I have twice been on the point of performing abdominal section on account of suspected rupture of a fallopian tube, and have been prevented by scruples as to the correctness of the diagnosis. In both cases, post-mortem abdominal section showed that the suspicion was correct, and I believe both of these patients might have been saved."

Other authorities might be quoted indorsing the opinions thus expressed, but I think these will suffice to show the general conclusions of those most familiar with the subject. In the case that forms the basis of this communication, the subject of transfusion was entertained and rejected. Previous to the operation I could only conceive that it would have been harmful. Where we have to deal with concealed hæmorrhage, and there are such doubts as to its precise location and character as may render it questionable whether we are warranted in adding the shock of an operation to that already existing, the issue of the case will depend upon the success with which we can keep the circulation at a minimum consistent with life. If we resort to means which raise arterial tension, we shall interfere with the conservative process which we initiate with more or less success in the application of hæmostatics, and certainly cause fur-

ther leakage from partially occluded vessels. In this case, after the blood supply was cut off by the application of ligatures, I had faith in the natural robustness of the patient, and though she hovered between life and death for twenty-four hours, the condition of the pulse after that time and up to within a few hours of death justified the confidence I had placed in those resources. The heart failure, which occurred more than forty hours after the bleeding was arrested, I attributed to shock, which I did not think could be beneficially influenced by transfusion, and consequently did not feel warranted in resorting to a means that I certainly do not regard as free from danger.

A RECORD OF THE PRINCIPAL ANATOMICAL ANOMALIES NOTICED DURING THE DISSECTION OF ONE HUNDRED SUBJECTS.

BY ROSWELL PARK, M.D.,

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OSSEOUS SYSTEM.

IN one case, only eleven ribs on each side. In another, a thirteenth rib—rudimentary—two inches long, on right side. In another, the left fifth rib bifurcated about three inches from sternum, to which it was attached by two cartilages.

MUSCULAR SYSTEM.

In eleven subjects out of one hundred, a *psoas parvus* present on one side or both. In three, no *palmaris longus* on one side; in two, none on either side. In two arms of different subjects, muscular fasciculi were given off from *extensor indicis* to back of ring finger. In one, an extra muscle from lower fourth and outer border of radius, inserted into palmar surface of trapezium and its vicinity. In one

left arm there was a double extensor ossis metacarpi pollicis, one attached normally, the other into the trapezium. In three left arms the biceps had three heads. In one of these the third head arose from the middle of the humerus and joined the main tendon on outer side of the brachial artery. In one left hand the opponens pollicis arose with the extensor ossis metacarpi pollicis, from radius and ulna, passing down as a tendon to the spot where its belly properly should be, then expanding into a muscular mass, and being inserted into outer head of the flexor brevis.

In one subject there was a muscle extending from superior curved line of the occiput (right) down to aponeurosis of the serratus posticus superior, opposite seventh cervical spine; it lay in its own sheath on the splenius capitis. In one case the pyriformis was attached to the digital fossa. In another, the glutæus medius (right) occupied the great trochanter, and the pyriformis, obturator internus and gemelli were all inserted into the digital fossa.

CIRCULATORY SYSTEM.

In one arm the radial was given off from brachial opposite insertion of coraco-brachialis. In a left arm the posterior circumflex was given off from the subscapular. In one subject on right side a small trunk supplying that side of thyroid membrane was given off from external carotid between superior thyroid and lingual. In two cases the left vertebral was given off directly from arch of aorta. In one of these the superior mesenteric rose one-quarter inch above the cœliac axis, and the left obturator was given off from the femoral about one inch below Poupart's ligament.

In two cases the obturator on each side was given off from the epigastric and skirted around Gimbernat's ligament. In one subject the right ilio-lumbar left the common iliac one-quarter inch above its bifurcation. In one case the deep epigastric was given off from the femoral, on each side, an

inch below the crural arch; while the profunda femoris in each leg was very large—equalling the femoral in size, and on right side giving off the external circumflex.

In one case on left side the thyroid axis gave off the inferior thyroid and transversalis colli, the suprascapular being a separate trunk from the subclavian, second part of its course. In another there was no thyroid axis on left side; there being two trunks, one forming the inferior thyroid, the other the transversalis colli and dorsalis scapulæ. In another the superior thyroid, on one side, came directly from common carotid, three-quarters inch below its bifurcation, and on each side the suprascapular artery passed through the notch instead of over it. In another there was a branch from the external carotid to the hyoid bone, the lingual coming from the facial, and the subscapular and alar thoracis came from the long thoracic, while the anterior circumflex was absent.

In three arms the anterior ulnar recurrent was given off from the brachial. In a left arm the brachial gave off a branch opposite the insertion of the deltoid, which ran down *just below the skin* on ulnar side of the forearm, and took the place of the ulnar; the branch given off where the ulnar is, became the interosseous. In this same subject the spermatic artery of one side gave off a branch to the kidney about one inch below renal; and there was no sacra media.

In two cases the obturator came from the external iliac and skirted along the internal ring. In another, on both sides it came from the femoral an inch below Poupart's ligament, and doubling on its course skirted round the femoral ring to gain its proper place, in such a way that it must have inevitably been cut had herniotomy ever been done.

To one kidney there were given off two long renal arteries. To another, one large renal dividing into three, with an additional one leaving the aorta three-quarters inch above

its bifurcation, and passing upwards into lower end of same kidney, anastomosing in pelvis with the other three (specimen in my possession). Another kidney had an extra renal artery given off two inches below proper one, passing into its lower end.

In one left arm the radial was given off from third point of axillary, running parallel with the brachial to its proper location, and giving off no premature branches. In both arms of a colored subject the radial was given off from the brachial above the superior profunda. In two others it was given off opposite the insertion of the deltoid.

In a right arm a branch was given off from the ulnar, one inch below bifurcation of brachial, which pierced the median nerve, and ran in its substance to the palm of the hand, where its terminal branches anastomosed with those of the thenar eminence. In the same arm a "wild" branch from the brachial ran down superficially, to be lost among the flexor muscles at bend of elbow. In one hand the deep palmar arch was formed by the ulnar and the deep branch of radial, the superficial arch by the superficial volar and anterior interosseous.

NERVOUS SYSTEM.

In one case the median nerve perforated the flexor sublimis about the middle of the forearm. In one the sciatic and peroneal nerves were in distinct sheaths clear up to their foramen of exit. In a left brachial plexus no branch came from the first dorsal nerve. In four arms the musculo-cutaneous passed *over* instead of through the coraco-brachialis. In two the heads of the median did not unite till they reached the vicinity of the elbow. In two left arms the median gave off the musculo-cutaneous; and in one right arm the latter gave a branch to the former.

HISTORICAL AND BIBLIOGRAPHICAL NOTES.

A SERIES OF SKETCHES OF THE LIVES, TIMES AND WORKS OF THE OLD
MASTERS OF ANATOMY AND SURGERY.

By GEORGE JACKSON FISHER, M. D.

XXII. ABOU MERWAN BEN ABDEL MELEK BEN ZOHR, COMMONLY CALLED AVENZOAR.

[CONTINUED.]

• 1070—1161.



VENZOAR also gave a very clear account of abscess, or purulent collections in the pericardium, and likewise of adhesion of the pericardium, in which case the sac is obliterated—a condition mistaken by Columbus and others, and described as hearts without any pericardium.

In the treatment of consumption he refers to Galen's advice, to use asses' milk, but adds that, as it is unlawful for the Saracens to eat the flesh and to drink the milk of this animal, he has substituted goat's milk in such cases. This is the first mention of goat's milk as a special diet for the sick. In this day of milk treatment it is interesting to trace the early history of its therapeutical uses.

Avenzoar, of all the Arabian surgical writers, speaks approvingly of the operation of bronchotomy. He believed it would be justifiable in desperate cases of quinsy, under

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which term in that day croup and all cases of inflammation of the neck were included. He never performed it, never saw it done, and was too timid to be the first to recommend it to be done. To satisfy himself the better that it is practicable, he made an experiment on a goat, making an incision through the tracheal rings, about the size of a lupin (wolf-bean), dressed the wound every day with honey water, and when it began to incarn (granulate) he applied powder of cypress nuts, and thus he perfected the cure.

The most interesting observations to be found in this excellent author relate to artificial methods of nourishing the body in cases of inability to swallow food. He proposes three methods. The first is by introducing an œsophageal tube, made of silver or of tin, as far down as it will readily pass, and through this pipe to pass milk or other thin nourishment into the stomach. This method is not previously mentioned by any writer. It is the progenitor of the stomach-pump. The second expedient is the employment of nutritious baths, such as milk, etc., depending upon cutaneous absorption. Of this method he speaks slightly, and even ridicules it as frivolous. The third mode, that of rectal alimentation, of which we hear so much now-a-days, he regarded as very useful, notwithstanding that Galen had asserted that fluids could not be made to ascend to the stomach by the use of clysters. Avenzoar argues the point at length, and thinks that an empty condition of the intestines and great bodily need of nourishment quite alters the case and promotes the absorption. Oribasius (*Collect. viii.* 34,) has left us a short chapter on clysters.

Avenzoar describes four modes of treating inversion of the ciliary hairs—trichiasis: 1. By everting the upper eyelid and securing it with agglutinants until the roots of the hairs have been cauterized with a rod of gold. This method he condemns. 2. By extirpating the offending hairs and apply-

ing the blood of a bat to the places from which they were torn. 3. By making an excision of the superfluous skin of the eyelid, and afterward applying sutures. 4. By twisting the skin about small reeds or tubes, in the manner described by Paulus Ægineta and Albucasis.

In treating of adhesion of the eyelids Avenzoar directs us to make the separation by means of a golden rod or probe, and then to apply the white of an egg broken with oil of roses, and oil of almonds. When the eyelid is adherent to the white of the eye he advises to separate the adhesion by the gentle use of a golden spatula, and then to use the same dressing as above mentioned. He adds, however, that it is cured with difficulty.

He treats of cataract very briefly, advising the operation by depression when it proves incurable by remedies. He directs that it be well pressed down but says nothing of tearing it in pieces. In its after-treatment he recommends retirement, abstinence, and rest.

In fistula lachrymalis, Avenzoar resorted to compression and injections, but does not describe any other surgical operation. He says the pus passes into the nose, from which it may be inferred that he was acquainted with the anatomy of the lachrymal duct.

Avenzoar states that trepanning the skull should be resorted to in cases of fracture with depression; but laments that in his time it would be difficult to find a surgeon capable of performing the operation. Averrhoes also intimates that he did not know of a surgeon who could trepan the skull. It is evident that the Arabian surgeons of mediaeval times were timid operators.

The first attempt to diminish the size of a calculus impacted in the urethra is described in the works of Avenzoar (*Theizir, lib. 2, tract. 4, cap. 1.*). After having given directions for extracting a calculus from the urethra, he then

proceeds to teach the manner of breaking, or as is most probable, of grinding it down by an instrument which would appear to be a sort of drill, which he describes as a "thin polished rod, made of gold or silver, and having a pointed adamant enchased in its extremity."

In treating of the best means of relief for persons suffering from stone in the bladder he expresses his utter disgust of the operation of lithotomy, as it is opposed to the principles of his religion which forbids the scrutiny of a part of the body too unclean to be seen with the eyes of the faithful.

He styles this operation filthy and abominable, and unfit for a man of character to perform. He does not hesitate, however, to discourse of this and other operations upon these parts. The fastidiousness of the Arabians of the middle ages is not uniformly consistent, and this remark is equally applicable to some of the so-called Christians of the present period.

EBN-ZOHAR, THE SON OF ABENZOHAR.

Abenzohar was happy in having a son who was possessed not only of mental qualities worthy of his sire, but also inheriting the same scientific tastes, the refined sentiments, and the poetical aspirations of his gifted father. He lived as did his father, at the court of the ruler of Moorish Spain, Joseph ben Tachefyn of Morocco, and also enjoyed the confidence and royal favor of that prince.

Ebn-Zohar was the pupil of his distinguished father, as was also the illustrious Averrhoes, to whom the next sketch of this series will be devoted. As one would reasonably expect from such a master, with such an associate pupil, and such royal patronage, the son of Avenzoar made an easy flight to a position of pre-eminence in his profession. He wrote a number of medical treatises, which are enumerated

by Ebn-Abi-Osaiba, in his history of Arabian Physicians. None of these works, which were held in high esteem among the Arabs, have ever been set in type.

Leo Africanus has preserved a very interesting anecdote of the sovereign, Joseph ben Tachefyn, which exhibits the generosity, and the kindly estimation in which he held his favorite physician. "Departing for Africa, he took with him Ebn-Zohar, who was as great a poet as physician. Having entered one day unexpectedly into his cabinet, and not finding him there, Joseph, casting his eyes upon the papers lying on the table, saw some verses, in which his physician expressed his regret at being separated from his family, which remained in Spain. In a very short time the prince, without saying a word to Ebn-Zohar on the subject, sent an order to the governor of Seville, to cause the family of the physician to come with all possible dispatch to Morocco, where they were lodged in a great palace, richly furnished, and which was made a present to them. Ebn-Zohar being sent to this palace, under the pretence of seeing some sick persons, was very agreeably surprised thus to find himself in the midst of his family, which he believed were at so great a distance from him."

After a life of devotion to humanity and science, having shunned the effeminating influences of an opulent court, having chosen the active labor of his profession, and the earnest studies dictated by his training and his tastes, he closed his earthly career at the age of seventy-four, in the year of Christian grace 1216.

Several manuscripts of Avenzoar's works are still extant. In the Bodley Library at Oxford, n. 6234 with the title *Ebn-zohar de Medicina*; Haller cites the following codices: *Abenzoar de regimine sanitatis*, in B. F. Bernard 3630. *Theisir*, *Abn Meron*, in B. Cai. Gonvil, n. 974.

I find it somewhat difficult to determine with precision

just how many editions of the works of Avenzoar have been printed. The bibliographers have all been a little confused, some giving dates which are ignored by others. I have taken a conservative course and only entered those which have at least the authority of two medical bibliographers. Atkinson gives the following not otherwise mentioned, which should be regarded as doubtful—viz. *Lugd.* 8°, 1561. *Venet.* fol. 1576. *Ibid.* fol. 1583, also that which Jourdan gives, *Venet.* fol. 1549.

All three of the fifteenth century editions are rare.

It is with a sentiment of profound respect, almost amounting to reverence, that I lay my hands upon my fine old Venetian folio copy, with its stamped hog-skin back, its fine brown, highly polished, heavy oaken sides, its brazen clasps, its double-columned pages of Gothic type, published from the press of *Otinum papiensem de luna. Anno domini nostri jesu christi. Mccccxcvij decimo kalendas januarias.* It was printed at the same time and bound with Averrhoes. This copy once graced the rich shelves of that venerable and noted bibliophile, Dr. Davidson of Breslau. Why should I not prize it; how many conservators have treasured it during the three hundred and eighty-six years that have elapsed since it was sent abroad to enlighten the world. When I touch this grand old volume I feel that I have stepped back over more than half the period of time that has intervened since Avenzoar flourished in his beloved city of Seville, and methinks I feel his touch reaching down through the ages to greet one who is endeavoring to perpetuate his name in an age so unmindful and regardless of the labors and opinions, the principles and practice, that prevailed in by-gone ages.

Venet. fol. 1490. Venet. fol. 1496. Venet. fol. 1497. Venet. fol. 1514. Venet. fol. 1530. Lugd. 8°, 1531. Venet. fol. 1533, cum Averrhoes, Venet. fol. 1553. [Eloy and Haller give Venet, 4°, 1628.]

NEW YORK SURGICAL SOCIETY.

EXCISION OF A PORTION OF THE SPINAL ACCESSORY NERVE FOR SPASMODIC TORTICOLLIS.¹

DR. H. B. SANDS presented a patient thirty-nine years of age, a druggist by occupation, who had consulted him in May, 1882, on account of the disease which first appeared nine months previously. The attacks of spasm were at first less frequent than they became subsequently, and produced a rotary movement of the head, causing it to turn forcibly toward the left side. No effort upon the part of the patient could prevent this movement. In the beginning, the turning of the head occurred about once in three minutes; subsequently it became more rapid, and it was estimated that the intervals between the movements did not exceed three seconds. Before he came under Dr. Sands' care, he had been treated by Dr. Seguin, who had thoroughly administered hyoscyamin, the bromides, atropia, conium, and other remedies, without any beneficial result. The patient, when Dr. Sands first saw him, was quite weak, and the contraction of the sterno-mastoid upon the right side was almost constant. It was decided to excise a portion of the spinal accessory nerve. In a previous operation he had followed the plan suggested by the late Mr. De Morgan, of making an incision along the posterior margin of the sterno-mastoid muscle, exposing the nerve and tracing it forward, but he had found this procedure difficult and unsatisfactory. He therefore determined to try an operation by which the nerve could be reached not far from its exit from the skull, just in front of the point where it penetrates the muscle. He made an incision three inches in length along the anterior margin of the sterno-mastoid, commencing close to the mastoid process. After exposing the muscle, and turning it outward, he readily found the spinal accessory nerve, where it crosses the internal jugular vein, which was felt, though not seen, during the dissection. A portion of the nerve,

¹ Stated Meeting, October 9, 1883.

a quarter of an inch in length, was excised, and the wound was closed by sutures and covered with an iodoform-dressing. Healing by adhesion was complete on the 24th of May, nine days after the operation. Immediately after the operation the sterno-mastoid ceased to contract, and it is now paralyzed and atrophied. The patient, however, did not recover immediately from the torticollis, as there still remained a marked tendency to rotation of the head toward the left side, this being due mainly to contraction of the left splenius muscle, which could be felt as a thick, hard mass. On the 7th of June, however, the condition of the patient was very much improved, and by the middle of June he was nearly free from spasm. For six months afterward he continued to suffer at intervals, and regained entire control of his movements only after going into the country, and improving his general health. Even now, he occasionally finds that his head is disposed to turn to the left side, but he has no difficulty in preventing this movement, or in turning to the right. Considering his distressing condition when he came under Dr. Sands' observation, the result must be regarded as quite satisfactory.

Dr. Sands also presented another patient, an expressman, aged 31, upon whom he had performed a similar operation, and removed two-fifths of an inch of the spinal accessory nerve, on the 25th of June of the present year. The patient had been engaged as an expressman for fourteen years, during which time it had been his habit to carry trunks upon his right shoulder, turning his head well toward the left side, then, in his opinion laying the foundation of his disease. Four or five months before he came to Dr. Sands, he began to experience some difficulty in turning his head to the right side, and also became subject to clonic spasm of the muscles, which turn it in the opposite direction. Seven weeks before the operation, he was treated by the application of the actual cautery, along the course of the affected muscle, but without any good effect. This treatment however, was followed by tonic spasm of the muscle, so that from that time there was no longer a rotary movement, but an extreme rotation toward the left side, so that his face looked over the left shoulder. The case then resembled more one of ordinary torticollis, than it did one of clonic spasm. In this instance the discovery of the nerve

at the time of the operation was more difficult than in the former one, and the internal jugular vein was more distinctly exposed. The wound healed without suppuration, and on the 18th of July he left the hospital much improved. As in the other instance the sterno-mastoid and trapezius were paralyzed, yet recovery was gradual. For several weeks he had some difficulty in keeping his head in the proper position. He is now, however, quite well; in this case two or three weeks after the operation, it was noticed that the head was still inclined to turn toward the left side, the left splenius, the trachelo-mastoid, and the inferior oblique being probably the muscles contracting. Dr. Sands believed that it was usual in cases of spasmodic torticollis, to find that the sterno-mastoid is not the only muscle affected. In a case reported by Mr. De Morgan, many muscles were involved, including those of the eye-ball. Dr. Sands had seen a case about a year ago, in which the integument could be observed, to be raised during spasmodic contraction of the omo-hyoid.

The cure by division of the nerve seems to be gradually effected, and to be due to the cutting off of the nervous supply of one of the principal muscles involved in the disease. He did not feel certain of a permanent result in either of these cases, but the condition is now such as to afford great encouragement. He regarded the operation by dividing the nerve anteriorly as far better than that suggested by De Morgan, because, by cutting in front, the nerve can be reached before it divides into branches, and a portion of the common trunk excised quite near to its exit from the skull.

FOREIGN BODY IN THE LEFT BRONCHUS—REMOVAL—CURE.

Dr. R. F. Weir presented a patient, a woman twenty-five years of age, who on the 26th of August went to have a tooth extracted. While partially under the influence of the anæsthetic a portion of the tooth escaped from the forceps and was inhaled. She suffered from marked dyspnœa, which continued for some time, but finally she got easier and went home. From that time until six days afterward she had frequent attacks of dyspnœa, which were relieved very much by the administration of morphine. When Dr. Weir first examined the patient he found evidence of obstruction at the

level of the sixth dorsal vertebra, and two inches to the left of the median line, where could be heard a whistling sound that extended from the lower portion of the lung. When she was in an erect position this sound disappeared from the chest. After she entered the hospital the attacks of dyspnœa were becoming more frequent. On the thirteenth day, after the tooth had become lodged in the chest, the operation for the extraction of the foreign body was performed. Prior to opening the trachea an attempt was made, while under the influence of the anæsthetic, to dislodge the foreign body by inverting the patient and shaking her, jarring the chest, etc., but as it was unsuccessful, tracheotomy was resorted to, with the patient's head strongly thrown back, the opening being made as low down as possible. Several rings were divided, and an opening made sufficiently large to admit the finger, which Dr. Weir endeavored to pass into the trachea, but this he was unable to do. He then introduced a bent forceps, like the ordinary nasal polypus forceps, carrying them in to a depth of four and a half inches; entered the left bronchus, and was able to touch the foreign body, but could not seize it. Different bent forceps were then introduced, but he failed with any in catching the tooth. A piece of wire slightly twisted to form a loop was tried, the same loop bent upon itself to form a hook was also introduced, but without success. Before ceasing instrumental interference it was finally determined to use a wire, to which a number of threads had been tied. While this was being prepared Dr. Little suggested that an ordinary piece of silver wire be bent into the form of a loop, and introduced. This was quickly prepared, and Dr. Weir passed it deeply in the air passage, and happily it caught upon the foreign body. The resistance, however, was so firm, that he did not dare to make very much traction, but with the wire held taut he introduced the forceps, passing them along by its side, and with the wire and the forceps he succeeded in withdrawing the foreign body, which was the smaller one-half of a wisdom tooth. The tooth seemed to have been lodged upon the anterior wall of the bronchus; that is, the line of traction seemed to have been in that direction. The opening in the trachea was made so low down that when the patient was relaxed it was found that the lower half of the incision was below the sternum. Only a very slight amount of bronchitis followed the operation and complete recovery took place.

Dr. Weir also reported a case, that of a child, two years of age, who inhaled a coffee bean, two days previous to the one just reported, and in whom he performed also tracheotomy for its extraction. When the patient was first seen, the house surgeon was about to perform tracheotomy, but just as the skin was divided the child suddenly ceased coughing, and breathed so easily that the operation was abandoned on the supposition that the foreign body had been removed. Two hours later, however, when Dr. Weir first saw the case, the child was breathing with considerable difficulty. He then opened the trachea, searching above and below, but did not feel the foreign body. A suture was introduced on each side of the opening, so that the edges of the wound could be held apart, if at any time it became necessary to further explore the trachea. The progress of the case proved that this was a wise precaution ; for, soon after the child was found breathing very peculiarly. The tube which had been introduced was withdrawn, the wound in the trachea was held open by means of the sutures, and out popped the roasted coffee bean, considerably swollen. Pneumonia developed, and the child died on the third day afterward.

Dr. Sands said that an unsuccessful attempt to explore the trachea by means of the finger in Dr. Weir's case, recalled to his mind a case which occurred many years ago in St. Luke's Hospital. A portion of an india rubber tracheotomy tube had lodged in the left bronchus, and some difficulty was experienced in determining exactly where the foreign body lay. In that instance Dr. Sands passed his finger down through the tracheal wound, and immediately detected the foreign body just below the point of bifurcation. A forceps was then inserted, and the foreign body extracted. Since making this discovery, he had often demonstrated upon the cadaver, that he could pass his finger into the trachea, always as low as the place where it divides, often being able to cause the extremity of the index finger, perhaps to enter either bronchus a distance of half an inch. This mode of exploration may be of great value by enabling the surgeon to determine exactly where a foreign body lies, so that it can be readily seized with a forceps.

The president remarked that these cases illustrated one point in diagnosis which had interested him. In a case which he had sometime ago, one in which a shirt button passed into the right bronchus, and which he extracted with the for-

ceps, after tracheotomy, Dr. J. R. Leaming made the diagnosis as to location of the foreign body. In that instance the obstruction was manifestly in the two lower lobes of the right lung, the upper lobe being perfectly resonant, and the respiratory murmur distinct. In the case which Dr. Weir has now reported, the position of the foreign body was determined by the fact that the whole left side showed absence of the respiratory murmur. In the right bronchus, the bronchial branch which goes to the upper lobe sometimes comes off very near to the bifurcation, and from this point there is quite a distance before the next division takes place. It is between the first branch and the second point of division of the bronchus that the foreign body lodges, when it enters the right bronchus; when the foreign body enters the left bronchus, there is no branch until the tube breaks into its final divisions nearly two inches from the trachea and therefore when this left bronchus is obstructed, all entrance of air is excluded from the whole of the left lung.

REMOVAL OF THE ENTIRE TONGUE, SUBMAXILLARY AND
SUBLINGUAL GLANDS, AND THE LATERAL WALL OF
THE PHARYNX BY KOCHER'S METHOD—CURE.

Dr. W. T. Bull presented a man forty-one years of age, who had been in good health up to four months before admission to the hospital. At that time he observed a small ulcer on the left side of the tongue, and at the same time a swelling under the jaw. Both increased rapidly in size, the tongue becoming hard about the edges of the ulcer, and causing severe pain at night and while eating. His appetite had continued good, and he had not materially depreciated in weight or strength. On examination a ragged excavated ulcer was found on the left side of the tongue about its middle, reaching upward to the dorsum, backward as far as the palato-glossal fold, along which it extended to the mucous membrane covering the posterior edge of the internal pterygoid muscle. Its edges were indurated, surface sloughy, discharge sanious. The submaxillary gland formed a mass of twice its normal volume, but was not hard nor tender. No other enlarged glands. A piece of the edge of the ulcer under the microscope proved to be epithelioma. Operation August 11, preliminary laryngotomy was done, and the pharynx stuffed with sponges on strings. By raising a tri-

angular flap, the submaxillary triangle was explored, the facial artery and vein ligated. The submaxillary gland removed, then the lingual artery and vein tied, and the sublingual gland, with one-half the tongue, removed with the scissors as far back as the hyoid bone. The other half was removed in the same way, as well as the mucous membrane of the pharynx beyond the posterior pillar of the fauces, and as low down as the hyoid bone—including that covering the inferior and posterior part of the pterygoid muscle. A hard enlarged gland was now found under the sterno-mastoid, closely adherent to the carotid sheath, and was extirpated. Several bleeding spots were touched with the cautery. Moderate bleeding occurred during the operation, as all the large vessels were tied before being cut, and the forcipressure forceps were freely used. The wound was left open, the raw surfaces covered with iodoform gauze, and absorbent cotton and gutta serena tissue applied over it. The pharynx and mouth were stuffed with gauze moistened with Thiesch's solution of boracic acid 1 part, salicylic acid 6 parts water 500 parts; the tracheal wound covered with a carbolized compress.

The only nourishment given during the first twenty-four hours was two enemata of beef-peptonoids with whiskey. After that the stomach tube with a funnel attached was introduced twice daily, the gauze in the mouth being removed each time. Between two and three pints of milk, and later beef tea and soup, and milk punch, were administered at one time. The iodoform gauze was not changed till the sixth day, after that the gauze in the mouth was discontinued, and the iodoform gauze removed once or twice daily—the granulations being sponged with the boro-salicylic solution. There was no constitutional reaction, the pulse not going above 90, nor the temperature above 99. On the fourth day the man sat up for several hours. On the seventeenth day he took food himself, although the wound would admit three fingers. The discharge was moderate, never offensive. The wound was the size of a goose quill at the end of five weeks—reduced to a trifling sinus a week later, and entirely closed at the end of seven weeks. The cicatrix is drawn up behind the lower jaw, the motions of which are not impeded. There is no sign of recurrence. The contraction of the cicatrix has drawn the anterior pillar of

the opposite side of the fauces markedly toward the median line.

Dr. W. T. Bull presented a specimen of

SUBPERITONEAL FIBROID TUMOR OF THE UTERUS, WITH
BOTH OVARIES AND STUMP OF THE UTERUS, RE-
MOVED BY LAPAROTOMY.

A single woman, aged 34, was admitted to his service at St. Luke's Hospital in August of this year, with a history of frequent backache, dragging pains in lower part of abdomen, and vesical tenesmus for three years previously, menstruation regular. In the middle line of the lower part of the abdomen was a smooth and rounded tumor as large as a child's head—plainly felt above the pubes and in the cul-de-sac of Douglas. It was movable, not tender, apparently cystic, and the uterus lay in front of it, was anteverted and thrown over to the right, where the fundus could be felt through the abdominal wall. The operation was performed on August 14. After exposing the tumor by an incision five inches long, adhesions were found to the ovaries and uterus. A double silk ligature, carbolized, was passed round each broad ligament. The uterus just above the vaginal junction, first temporarily constricted with an *écraseur* and the tumor cut off an inch and a half beyond this. The pedicle (uterus) was then transfixed and tied with carbolized silk, cut off again half an inch beyond the silk, rubbed with iodoform and returned. On the left side of the pelvis the torn surface of the broad ligament bled. One silk ligature was applied and the surface rubbed with iodoform.

The sutures were removed on the 15th day. Temperature ranged between 98 and 99.5 F. on the second. Third and fourth days there was vomiting and slight abdominal pain and tympanites.

The tumor was examined by Dr. Ferguson, who reported that it was a fibro-myoma, subperitoneal, from the posterior surface of the uterus, about equally from the body and neck. The ovaries are normal in size, the left containing two small cysts. The uterine body is slightly enlarged and laterally flexed. The neck above the point of section is elongated. The mucous membrane is normal.

EDITORIAL DEPARTMENT.

ON MALPOSITIONS OF THE KIDNEY.

In a thesis for the degree of M. D., David Newman, M. B., has given¹ a very thorough and complete summary of existing knowledge in regard to malpositions of the kidney, and the interest of the treatise is much enhanced by the singular good fortune of the author, in encountering several cases of displacement both in the mortuary and in practice. There is much diversity of opinion regarding the pathological importance and treatment of a misplaced kidney, but the majority of observers, according to the author, regard kidneys permanently fixed in an abnormal position as of no clinical importance. On the other hand, when floating freely in the abdomen, and causing serious symptoms, surgeons have promptly removed the offending organ. Keppler and Landau represent the extremists, the former claiming that a movable or floating kidney should be excised as soon as discovered, the latter maintaining that death does not result from this abnormality and that nephrectomy is never advisable. Proceeding to discuss these diverse views, he says, "Displacements of the kidneys may be divided into three kinds; simple misplacement, without mobility of the organ; 'movable kidney,' when the kidney is perceptibly mobile behind the peritonæum; and 'floating kidney,' where the peritonæum forms a meso-nephron which attaches the kidney loosely to the spine."

Simple misplacement of the kidney without mobility was found to be not uncommon; and may exist without causing any disturbance. In three hundred autopsies, eight cases occurred where the position of one or both kidneys was abnormal, and in only three of these cases was the supra-renal capsule also malposed, showing that in spite of the close anatomical relation of these bodies to the kidneys, they do not necessarily partake of the misplacement. The malposition varies greatly, the kidney in one case being found close to the

¹ *Glasgow Medical Journal*, August, 1883.

spleen almost touching the spine, and in another, below the crest of the ilium and some distance from the vertebral column. Malpositions of the kidney were generally associated with some abnormal position of the large intestine and peritonæum, and with deviations in the number and distribution of blood vessels, as well as in the course and length of the ureter. These cases of simple misplacement seldom if ever give rise to symptoms, and are therefore of slight clinical interest, but cases have been reported where the misplaced kidney has been mistaken for an abdominal tumor, or, from its position in the pelvis, has obstructed labor.

"Movable kidney" and "floating kidney," terms usually considered synonymous, must be carefully differentiated for the sake of an intelligent pathology and treatment. Says the author :

"In cases of 'movable kidney' the organ is mobile behind the peritonæum, either in its adipose capsule, or in a sac formed between the peritonæum and the muscular wall of the abdomen, whereas, in cases of 'floating kidney,' the kidney moves about within the cavity of the peritonæum, and is attached by a mesentery to the spine." "The distinction here drawn between movable and floating kidneys was adopted by Sir William Jenner, in his Clinical Lectures on the Diagnosis of Extra-Pelvic Tumors of the Abdomen. He says, 'I told you that the kidney is moved a little by the respiratory movements. Sometimes it can be moved by the hand, and this much more frequently than you would suppose. A movable kidney is one thing; a floating kidney is another. We very rarely see or feel a floating kidney. I have never met with one after death, though I have felt in a patient what has been supposed to be one. A floating kidney is one that has a mesentery, a fold of peritonæum attaching it very loosely to the spine. A floating kidney, therefore, can be moved about to a considerable extent, to the extent of the length of its mesentery. A movable kidney can only be passed up and down a little; it slips a little under your fingers.'" In a report by a Committee of the London Pathological Society, substantially similar statements are made in these words: "The peritonæum may be flaccid and loose to such an extent as to allow the kidney to move under it, so as to come in contact with the wall of the belly; or to leave its natural place and pass to or below the brim of the pelvis; or indeed in some cases, to en-

croach upon the opposite side of the belly. A like movableness or floating of the kidney may be due to the presence of a meso-nephron."

Mr. Lawson Tait,¹ in speaking of a case diagnosed as floating kidney by eminent authorities, but which proved to be a gall-bladder, distended, and containing a large number of gall-stones, said, "I put the floating kidney theory altogether on one side, besides, I have never seen such a thing either in life or in a museum, nor have I met any one who has. In fact I have no belief in its existence as a pathological incident." The author has investigated the literature of the subject, and finds several cases of floating kidney recorded and specifies two in which a meso-nephron is distinctly described.

The degree of mobility was used both by Jenner and the Committee of the London Pathological Society in making the diagnosis between movable and floating kidney, although the mobility may be equal in the two conditions. Clinically the distinction is difficult, but anatomically it is clear. The distinction is especially important when operative interference is in question, for access may be gained to the movable kidney without entering the peritonæal cavity, while in floating kidney the peritonæum must be incised.

The etiology of movable kidney is somewhat doubtful. It is established by statistical evidence that it exists in two and one-half per cent. of the patients examined, that the right kidney is more movable than the left, in the proportion of nineteen to eleven, and that the malposition is more frequent in women than in men, as in 290 cases collected by the author, 252 were in women, and 38 in men, or about one male case for seven female. As regards age, 46 per cent. were observed between the thirtieth and fortieth years, 20 per cent. from forty to fifty years of age, and in all, 81 per cent. between the ages of twenty and fifty, thus corresponding to the child-bearing period. Pregnancy therefore, would seem to be an agent in the production of this affection, by causing laxity of the abdominal walls, by the pressure of the changing uterus or by the strong voluntary contraction of muscles during labor. Sawyer, having observed a relationship between menstruation and the time when the kidney commences to move, has advanced the theory that the kidney becomes congested and therefore more weighty at the menstrual period, and

¹*British Medical Journal*, November, 1882.

hence the displacement results. But this can be neither a necessary nor a constant factor, because the displacement exists not uncommonly in the male. In two of the author's cases there was an increase in the intensity of the symptoms during the menstrual molimen, in one case symptoms being absent during the intervals, in the other there was both objective and subjective increase in size and weight of the kidney during the period. Dr. Sawyer remarks, "the circumstances which determine the liability to this affection, arise rather as a result of the sudden removal of pressure which the distended uterus exercises on the kidneys in common with the other organs within the abdomen." One-half of the patients suffered from conditions depending upon laxity of the perineum or abdominal walls. Tight lacing has been emphasized as an etiological factor by some writers, but as the great majority of cases occur in hospital patients, in other words those who pay very little attention to preserving their figure after delivery, the author is not inclined to lay stress upon this as a cause. The right kidney in the large majority of cases is the one affected. Out of 173 cases collected by Landau, in 152 the right, and in 12 the left kidney was movable, both kidneys being interested in 9. This fact is attributed to the anatomical peculiarities of the right side by the presence and weight of the liver, the greater length of the renal vessels, and the looser connection of the ascending colon to the right kidney, than of the descending colon to the left. Permanent laxity of the abdominal attachments is a frequent cause, and when the cushion of fat which normally embeds the kidney is absorbed, especially if the process goes on rapidly, the tunica adiposa loses its firmness and becomes loose and flaccid. Displacements and diseases of the uterus concur so frequently with movable kidney that there is apparently some relationship, this consisting probably in disordered intra-abdominal pressure.

Regarding pathological anatomy, the changes which take place are mainly confined to the environs of the kidney, although there may be structural disease of the organ itself. The adipose capsule is distended and atrophied, the peritonæum raised from the abdominal wall, and the renal vessels lengthened.

Dr. Newman gives a summary of four cases under his care in three years.

CASE 1.—Mrs. M'M., æt. 40. Seven children and three miscarriages in twelve years. Swelling appeared on right side after sixth confinement, and during her next pregnancy gave much pain, with dyspepsia and vomiting. Was obliged to be in bed for seven months before parturition. The nature of the swelling was not diagnosed until after delivery. Had pain in left side after the seventh pregnancy but not until some months was a movable left kidney discovered. Rest, poultices and belladonna gave passing relief, she was unable to bear an abdominal bandage, and her symptoms increased in severity, pain, vomiting and great general emaciation succeeding. The operation of nephroraphy was then performed. In the author's words, "All antiseptic precautions were attended to. The patient having been placed on her left side, an incision was made in the right loin, immediately external to the outer edge of the quadratus lumborum, and extending from the lowermost rib to the crest of the ilium, care being taken to avoid the diaphragm and pleura above, and the peritonæum in front. The tissues were divided down to the mass of fat surrounding the kidney, which was found to be freely movable behind the peritonæum. The kidney was not in position while I was cutting down upon the capsule, but was situated behind the anterior edge of the liver. As soon as the abdominal walls were divided, Dr. Donald Macphail, who assisted me, thrust his hand into the wound, and by a little manipulation succeeded in pushing the kidney into the incision and retaining it in position. Two sutures were then passed through the adipose capsule so as to retain it in position. The adipose capsule was then divided for a distance of about three and a half inches, and the convex border of the kidney was exposed. The kidney was easily pushed backwards and forwards within the adipose capsule, but the thin fibrous capsule was not loosened. The organ appeared to be perfectly normal. Two thick chromic catgut sutures were passed deeply into the cortex of the kidney so as to include its whole thickness. The needle entered the anterior surface, and passed out from the posterior aspect about half an inch from its convex margin. One suture was passed through the upper and the other through the lower part of the organ, and the kidney was allowed to slip back into the sac formed by the adipose capsule. The edges of this capsule were now carefully stitched to the deep edges of the wound in the parietes, and the sutures (8)

cut short. Three superficial sutures were then introduced, and the sutures through the kidney were also passed through the muscles, fascia and skin ; the kidney was then drawn into position, and a large drainage tube placed between the convex margin of the kidney, which now filled the bottom of the wound, and the superficial stitches. These stitches were now tied and the sutures through the kidney were secured externally by means of buttons. The hemorrhage during the operation was insignificant in amount." Recovery occurred quickly without untoward events, in ten days. Left kidney retained in position by abdominal bandage. Patient able to walk about, health much improved, and all symptoms absent.

CASE 2.—Mr. O., æt. 49. Mobility of right kidney, due to a fall, associated with sickening pain, vomiting, diarrhœa and occasional suppression of urine due to strangulation of renal vessels. Symptoms relieved in great measure by wearing a broad abdominal bandage.

The third case is similar to the first, but as disease of the kidney existed, no operation was performed, and the fourth case resulting from a fall was relieved by an abdominal bandage.

Concerning signs and symptoms, in the majority of cases the tumor is discovered accidentally. If the movement of the kidney is considerable a tumor of characteristic shape may be discovered. It forms a hard and resisting mass, very smooth and easily moved in various directions, especially into the lumbar region, and on handling a peculiar sickening, faint sensation is felt by the patient. Percussing over the renal region posteriorly a tympanitic note is obtained, and owing to the fact that the displaced kidney is covered by intestine, percussion over it gives muffled tympanitic resonance. Palpation in the normal renal region gives a depression when the kidney is out of place, and a sense of resistance when restored. Movement of the body alters its position greatly, the supine posture causing it to assume its proper place. Subjective symptoms may be absent, but generally the characteristic sinking sensation on pressure, and greater or less dull pain, sometimes paroxysmal is present. Dyspepsia, flatulence, vomiting and diarrhœa, alteration of quantity and quality of urine, with dýsuria occurs frequently. Suppression of urine with all the symptoms of uræmia may appear suddenly, due to torsion of the renal vessels or ureter, and associated with a rapid increase in size of the movable tumor.

The diagnosis of uncomplicated movable kidney is comparatively easy, if its occasional occurrence be borne in mind, and rests chiefly upon the proper comprehension of the physical signs. The differential diagnosis is to be made from enlargement of the gall-bladder, by position, shape, and fluctuation, jaundice, and absence of bile from stools; from a small ovarian tumor, by the size, form, attachments, and the tendency to increase in size or remain stationary; and from small pedunculated tumors of the omentum or mesentery, by the fact that the smoothness of surface, the ease with which the tumor slips into the lumbar region, the peculiar pain on pressure, shape, size, absence of kidney from its normal position, and the non-increase in size, all indicate the tumor to be a movable kidney rather than a new growth.

If the case is not of great severity, that is if the symptoms are not such as to show that life is endangered, and on the other hand, if organic renal disease exists, operation is counter-indicated. In these the author uses a well fitting elastic abdominal bandage, extending from Poupart's ligament to the level of the sixth or seventh rib, exerting an even pressure on all points. Every morning, the bowels having been emptied, and before rising for the day, a snugly fitting jersey should be put on, and a hair pad adjusted over the region of the kidney. The broad elastic bandage should then be buckled over all. Over exertion and active exercise should be forbidden, regulation of the bowels carefully attended to, and such constitutional treatment given, as may be required. If symptoms of strangulation occur, rest, hot poultices, and leeches over the seat of pain, and morphia should be ordered.

In discussing operative treatment, the author gives the preference to nephroraphy rather than extirpation of the kidney in the following paragraphs.

"1. In the operation of nephroraphy the organ is not removed, so that the secreting tissue is not diminished in amount as it is in excision, and there is therefore no danger of removing, as has been done, the only kidney the patient may be possessed of.

2. The mortality of excision, even in cases where the remaining kidney was healthy, is not very encouraging, (23 per cent.) whereas in eight cases operated upon by nephroraphy there have been no deaths.

3. Nephroraphy may be performed when both kidneys are movable, or when one of them is diseased. In one of Hahn's cases the kidney which was not displaced contained a calculus. This did not prevent the operation being successful.

4. In stitching the kidney to the abdominal wall, the peritonæum is not opened, as it is in the anterior operation for excision, where the membrane is incised at least twice.

5. Extirpation is only permissible when nephroraphy has failed and the patient's life is still seriously threatened, or when the movable kidney is diseased and the fixed kidney healthy."

Dr. Newman lays stress upon determining the condition of the opposite kidney when excision of the other is decided upon, and his method in women is catheterization of the ureter by the aid of an electric lamp introduced into the bladder, the urine obtained being examined in the usual manner. In the male, one ureter is closed by a block tin catheter in the bladder, making pressure upon two fingers in the rectum, the ureter being caught between them. The bladder being washed out just previously, the urine flowing from the unobstructed ureter may be collected and examined.

"Floating kidney," that is, with a meso-nephron one cannot be distinguished from a movable kidney during life. It is almost always congenital, and its only clinical interest to the surgeon is that its possible existence may be borne in mind, when operative procedure is contemplated. G. R. BUTLER.

FREE BODIES IN THE PERITONEAL CAVITY.

With the exception of Klebs' *Morbid Anatomy*, the textbooks contain only scant information about free bodies in the peritoneal cavity; and even Klebs' description is incomplete, and throws no light on their growth after they have become detached from the peritoneum.

Gustafsson¹ found, lying entirely loose between the coils of the small intestines of a human body, such a body measuring 4.5 by 3.7 and 3.3 centimeters. It was oval, convex, smooth, and of a yellowish-brown color. In attempts to cut through it the knife was arrested by a hard interior layer, which, by continued pressure, was divided. The cut surface shows in the centre an oval, yellowish-brown, friable nucleus,

¹ Contributions to the knowledge of Free Bodies in the Peritoneal Cavity, by A. P. Gustafsson; Transactions of the Medical Society in Upsala (Sweden), 1882, vol. xvii, p. 519, et. seq.

surrounded by a thin calcareous shell, outside of which was a cortical substance divided into two concentric rings, which differed rather much as to color and consistency. The outer layer was almost twice as thick as the inner one, of a dirty yellowish-brown color, somewhat translucent, of the consistency of tendon, somewhat elastic, and showing an indistinct concentric striation. Microscopical examination showed that the ring was composed of concentric lamellæ, separated by irregularly interspersed narrow fissures. The lamellæ, which were situated nearest to the surface, were thinner than the deeper ones, which had a pretty constant thickness of from $\frac{1}{100}$ to $\frac{1}{10}$ of a millimetre. The inter-lamellar fissures were filled with a granular shining substance. In the most superficial of them were found flattened, oval cell-nuclei, and on the free surface, similar almost, spherical and oval nuclei, and here and there endothelial cells detached from the abdominal wall. The granular shining substance in the deeper fissures was dissolvable in absolute alcohol and oil of cloves, and became black by treatment with osmic acid. In the more superficial fissures, where nuclei were visible, the reaction with absolute alcohol and oil of cloves first took place after a preparatory treatment with a diluted solution of potassa.

Near the inner layer the homogeneous substance of the lamellæ began to degenerate, showing small isolated or grouped, round clear bodies, some of which showed the concentric arrangement of amylaceous bodies. These resisted the action of staining solutions, acetic acid and diluted liquor potassæ, but were readily dissolved in dilute hydrochloric acid.

The inner layer of the cortical substance was opaque, grayish-white, differing in consistency, hard, rather brittle, and inelastic. It showed concentric striation like the outer layer. The fissures between the lamellæ were filled with a similar substance, as in the deeper parts of the outer layer, composed of round, bright bodies without any trace of a nucleus. The chemical reactions were likewise those mentioned above.

The calcareous shell, which was situated between the cortical substance and the nucleus, was one millimetre thick and formed of connective tissue fibrillæ, interspersed with a fine granular deposit of lime-salts.

The nucleus was in a state of cheesy metamorphosis, and

showed a structure entirely like that of common fatty tissue.

Taking as a basis the anatomical and chemical characteristics of the different layers, the author explains the origin and growth of these bodies in the following way :

Some small lump of adipose tissue covered with peritoneum, perhaps one of the epiploic appendices is gradually severed from its connection, and forms the nucleus of the body. The calcareous shell is formed by deposition of lime-salts in the capsule composed of connective tissue which surrounds the fat. On the other hand the lamellar cortical substance and the mass filling the fissures between them is gradually formed by a transformation of endothelial cells, which are detached from the peritoneum and adhere to the surface of the loose body. First they lose their body ; later the nucleus undergoes fatty degeneration, and finally lime-salts are deposited in the debris. Perhaps lymphoid cells swimming in the peritoneal fluid contribute, together with the endothelial cells, to the formation of the cortical substance. The lamellæ are an inter-cellular substance, formed by the cells.

H. J. GARRIGUES.

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